RK06

DISK DRIVE DIAG. PART 1

MD-11-DZR6H-C

EP-DZR6H-C-DL-B

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RK06

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IDENTIFICATION

PRODUCT CODE:	MAINDEC-11-DZR6H-C-D
PRODUCT NAME:	UNIBUS RK06 DISk DRIVE DIAGNOSTIC: PART 1
DATE:	DECEMBER 1976
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	GARY PAPAZIAN

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1.0 ABSTRACT

THIS PROGRAM PERFORMS PART 1 OF THE DRIVE DIAGNOSTICS
TO INSURE THAT THE
DISK IS CAPABLE OF PERFORMING ALL STATIC & CYCLE UP TESTS.
IT INSURES THAT THE DRIVE CAN WRITE AND READ HEADERS
IN BOTH 20 & 22 SECTOR FORMATS.
FINALLY, IT INSURES THAT THE DISK CAN PERFORM SEEK
OPERATIONS BY DOING SEVERAL SEEK PATTERNS.
ERROR DETECTION LOGIC IS CHECKED BY SOFTWARE ERROR FORCING.

AFTER A SUCCESSFUL RUN (WITH NO ERRORS) OF PART 1, THE DRIVE
IS READY FOR PART 2 OF THE DRIVE DIAGNOSTICS.

TESTING IS BASED ON A HIERARCHY APPROACH STARTING WITH
BASIC LOGIC TESTS AND PROCEEDING THRU DYNAMIC TESTING. THE
TESTS WILL BE KEPT SMALL TO FACILITATE SCOPING LOOPS.

*****CAUTION*****

HALTING THIS PROGRAM ANYWHERE BUT AT THE END OF A PASS,
MAY LEAVE THE HEADERS IN THE DISK CARTRIDGE IN AN
UNDETERMINED STATE.

2.0 REQUIREMENTS

2.1 HARDWARE

THE FOLLOWING HARDWARE IS REQUIRED TO RUN THE DISK DIAGNOSTIC:

PDP-11
CONSOLE TELETYPE
16K MEMORY
KW11-L OR KW11-P CLOCK
RK06 UNIBUS CONTROLLER (RK611)
1 TO 8 RK06 DRIVES

NOTES: 1. IF NEITHER KW11-L OR P CLOCK IS USED, ALL TIMING
TESTS WILL BE BYPASSED. A MSG AT THE
BEGINNING OF THE TESTS WILL CONFIRM THIS.

2. THE PROGRAM CAN WORK OFF EITHER FORMATTED OR
NON-FORMATTED PACKS.

2.2 PRELIMINARY TESTING & PROGRAMS

THE RK611 DISKLESS CONTROLLER DIAGNOSTICS (ALL PARTS) SHOULD FIRST RUN SUCCESSFU

3.0 PROGRAM CONSIDERATIONS

3.1 PDP-11 FAMILY COMPATIBILITY

THIS PROGRAM CAN BE USED BY THE PDP-11/04,05,10,20,
34,35,40,45,50, & 70.

IT IS COMPATABLE WITH THE LSI-11 INSTRUCTION SET AND CAN TEST
THE RK06 ONLY IF THE DRIVE CONTROLLER FOR THE LSI-11 IS
DESIGNED TO BE DIAGNOSTICALLY COMPATABLE WITH THE RK611.

3.2 XXDP

THIS PROGRAM CAN BE CHAINED BY XXDP & WILL NOT OVERLAY THE
LOADER.

CHAIN MODE OPERATION (MONITOR)

1. THE INPUT DIALOGUE IS BYPASSED.
2. THE BUSS ADDRESS & CONTROLLER INTERRORUPT VECTOR IS DEFAULTED.
3. DRIVE 0 WILL NOT BE TESTED.
4. ALL OTHER DRIVES IN THE 'DRIVE PRESENT' CONDITION WILL BE TESTED.

NOTE: THE DRIVE PRESENT CONDITION IS:

A. HEADS MANUALLY LOADED
B. CORRECT PORT SELECTED
C. WRITE LOCK DISABLED
D. DRIVE READY INDICATOR ON

DUMP MODE OPERATION (MANUAL)

1. INPUT DIALOGUE IF STARTED FROM 220.
2. DRIVE 0 CAN BE TESTED, BUT THE OPERATOR IS FIRST GIVEN A MSG TO REPLACE THE PACK IN DRO WITH A SCRATCH PACK & TYPE <CR> WHEN DONE.

3.3 ACT/APT

THIS PROGRAM IS ACT COMPATIBLE. IT IS APT
COMPATABLE TO THE EXTENT THAT APT HOOKS WILL BE IN THE
PROGRAM & WILL WORK THRU THE 'UPTON INTERFACE'.

FOR OTHER INTERFACES, APT MAY ONLY LOAD & START THE PROGRAM.
I.E. LOAD & DUMP MODE.

AUTOMATIC MODE (MONITOR)

1. THE INPUT DIALOGUE IS BYPASSED.
2. THE BUSS ADDRESS & CONTROLLER INTERRORUPT VECTOR IS DEFAULTED.
3. ALL DRIVES IN THE 'DRIVE PRESENT' CONDITION WILL BE TESTED.

NOTE: THE DRIVE PRESENT CONDITION IS:

A. HEADS MANUALLY LOADED
B. CORRECT PORT SELECTED
C. WRITE LOCK DISABLED
D. DRIVE READY INDICATOR ON

DUMP MODE (MANUAL): INPUT DIALOGUE IF STARTED FROM 220.

3.3.1 APT ETABLE DEFINITIONS

THE FOLLOWING DEFINITIONS ARE VALID FOR SPECIFYING APT ENVIRONMENTAL TABLE (ETABLE) ENTRIES, VIA RUNNING THE APT UTILITY PROGRAM "TSP":

1. SOFTWARE ENVIRONMENT:
    =1 IF APT SCRIPT MODE
    =0 IF STANDALONE MODE

2. ENVIRONMENT MODE:

BIT 7 = 1		ETABLE DOES SIZING
	= 0	PROGRAM DOES SIZING
BIT 6 = 1		SPOOL MSGS TO APT IF SCRIPT MODE
	= 0	DON'T SPOOL TO APT
BIT 5 = 1		SUPPRESS CONSOLE OUTPUT
	= 0	ALLOW CONSOLE OUTPUT
BITS 4-0		NOT USED

3. SWITCH 1 (SOFTWARE SWITCH REGISTER)
IF ENVIRONMENT MODE BIT 7 (SIZING BIT) IS SET TO 1, THE SOFTWARE SWITCH REGISTER WILL BE USED. INSTEAD OF THE HARDWARE CONSOLE SWITCH REGISTER. REGARDLESS OF WHICH ONE IS USED, ALL BITS DEFINED IN SECTIONS 4.3 & 4.4 (SWITCH REGISTER OPTIONS) MAY USED WHEN RUNNING IN STANDALONE MODE. IN APT SCRIPT MODE, HOWEVER, BIT 14 (LOOP ON TEST) MUST ALWAYS BE SET TO 0.

4. SWITCH 2 (USER SWITCH REGISTER)
    NOT USED

5. CPU OPTIONS:
    NOT USED

6. MEMORY TYPES 1-4 AND MAX MEMORY ADDRESSES
    NOT USED

7. INTERRORUPT VECTOR 1:
    USED WHEN ENVIRONMENT MODE BIT 7 = 1. DEFAULT = 210

8. BUS PRIORITY 1:
    USED WHEN ENVIRONMENT MODE BIT 7 = 1. DEFAULT = 5

9. INTERRORUPT VECTOR 2:
    NOT USED

10. BUS PRIORITY 2:
    NOT USED

11. BASE ADDRESS:
    USED WHEN ENVIRONMENT MODE BIT 7 = 1. DEFAULT = 177440

12. DEVICE MAP:
    USED WHEN ENVIRONMENT MODE BIT 7 = 1. EACH BIT
    SET TO 1 IN BITS 0-7 WILL SELECT THE CORRESPONDING
    DRIVE TO BE TESTED. BITS 8-15 ARE NOT USED.

13. CONTROLLER DESCRIPTOR WORDS:
    NOT USED

14. DEVICE DESCRIPTOR CODES (IN WORDS):
    NOT USED

3.4 DUAL ACCESS

THIS PROGRAM WILL NOT TEST OR SUPPORT DUAL-ACCESS. A DRIVE EQUIPED WITH DUAL ACCESS MUST BE SWITCHED TO THE PORT UNDER TEST TO PREVENT CONTENTION WITH THE OTHER PORT.

DUAL ACCESS TESTS WILL BE INCORPORATED IN A SEPARATE PROGRAM AT A LATER DATE.

3.5 MEMORY MANAGEMENT

MEMORY MANAGEMENT NOT USED

3.6 PARITY CHECK ENABLED

IF THE MEMORY PARITY CHECK OPTION IS AVAILABLE ON THE SYSTEM, THE PROGRAM WILL RUN WITH MEMORY CHECK ENABLED.

3.7 BAD SECTOR

THE PROGRAM WILL COMPARE DATA ERRORS WITH THE BAD SECTOR INFORMATION CONTAINED ON CYL 410, HEAD 2. PRINTOUTS OF DATA ERRORS DUE TO BAD SECTORS/TRACKS WILL BE MASKED OUT.

3.8 EXECUTION TIME

THE EXECUTION TIMES SHOWN BELOW ARE BASED ON THE PDP 11/50.

TOTAL TIME: 5 MIN, 30 SEC

A BREAKDOWN OF THE MORE LENGTHY TESTS ARE SHOWN BELOW:

TEST 16 STATIC CYL ADDRESS & DIFF REGS-PART 2: 2 MIN, 15 SEC
TEST 36 FORMAT PACK : 1 MIN
TEST 41 SEEK FROM CYL 0 TO ALL CYLS : 40 SEC

TEST 42 SEEK FROM CYL 410 TO ALL CYLS : 40 SEC

3.9 FAULT ISOLATION

TO BE DETERMINED.

3.10 ERROR CORRECTION AND FAILURE RATE ANALYSIS

THIS PROGRAM WILL NOT DO ERROR CORRECTION OR FAILURE RATE ANALYSIS.

3.11 DEFAULT UNIBUS ADDRESSES & VECTORS

THE FOLLOWING IS A LIST OF ALL DEFAULT ADDRESSES & VECTORS OF ALL HARDWARE TO BE USED & THEIR MEMORY ADDRESSES WHERE THEY CAN BE CHANGED.

	LOCATION	DEFAULT CONTENTS
RK06 BUSS ADDRESS	1264	177440
CONTROLLER INTERRORUPT VECTOR	1314	210
CONTROLLER PRIORITY	1316	240
P-CLOCK STATUS REG	1320	172540
P-CLOCK SET BUFFER	1322	172542
P-CLOCK READ BUFFER	1324	172544
L-CLOCK STATUS REG	1326	177546
L-CLOCK INTERRORUPT VECTOR	1330	100
P-CLOCK INTERRORUPT VECTOR	1332	104
TTY KB STATUS REG	1144	177560
TTY KB BUFFER	1146	177562
TTY PRINTER STATUS REG	1150	177564
TTY PRINTER BUFFER	1152	177566

4.0 OPERATING PROCEDURE & CONTROL FUNCTIONS

4.1 PROGRAM LOADING

THE PROGRAM CAN BE LOADED FROM PAPER TAPE USING STANDARD PROCEDURE FOR ABSOLUTE LOADER TAPES; OR FROM ANY MEDIA SUPPORTED BY XXDP.

4.1.1 LOAD THE STARTING ADDRESS (SEE SEC 4.2).

4.1.2 SET SWITCH REGISTERS AS DESIRED (SEE SEC 4.3).

4.1.3 SET DRIVES TO BE TESTED IN THE 'LOAD' CONDITION & WITH THE APPROPRIATE PORT SELECTED & WRITE LOCK DISABLED. DRIVES NOT TO BE TESTED MUST HAVE BOTH PORTS DESELECTED.

NOTE: THE DRIVE WILL NOT RESPOND TO THE 'START SPINDLE' CMD IF THE RUN/STOP SWITCH IS IN THE 'STOP' POSITION.

4.1.4 PRESS 'START'

THE PROGRAM WILL IDENTIFY ITSELF AND WILL BEGIN A DIALOGUE WITH THE OPERATOR TO DETERMINE DRIVES TO BE TESTED (SEE SEC 4.5).

THE PROGRAM BEGINS TESTING ONLY THOSE DRIVES SPECIFIED BY THE INPUT DIALOGUE. IF A SPECIFIED DRIVE CANNOT BE FOUND BY THE PROGRAM IT WILL BE FLAGGED AS AN ERROR THAT THE DRIVE WAS NOT AVAILABLE. THEN BEGINNING WITH THE LOWEST NUMERICAL DRIVE AND PROCEEDING IN SEQUENTIAL ORDER, ALL VALID DRIVES WILL BE TESTED. ONE PASS THROUGH THE TEST SEQUENCE WILL BE PERFORMED ON EACH DRIVE BEFORE MOVING TO THE NEXT DRIVE IN SEQUENCE. THE DRIVE TO BE TESTED WILL BE TYPED AT THE BEGINNING OF EACH PASS. "END OF PASS" WILL BE TYPED AFTER TESTING ALL DRIVES.

4.2 STARTING LOCATIONS

LOCATION 200 - STARTING ADDRESS TO DEFAULT THE BUSS ADDRESS & THE CONTROLLER INTERRORUPT VECTOR & TEST ALL DRIVES IN THE 'DRIVE PRESENT' CONDITION.

NOTE: THE DRIVE PRESENT CONDITION IS:

A. HEADS MANUALLY LOADED
B. CORRECT PORT SELECTED
C. WRITE LOCK DISABLED
D. DRIVE READY INDICATOR ON

LOCATION 204 - SAME AS 200 START BUT BYPASS TEST 16 (N SQUARE)

LOCATION 220 - STARTING ADDRESS TO INPUT TESTING PARAMETERS VIA THE INPUT DIALOGUE. BUSS ADDRESS & CONT. INTERRORUPT VECTOR INPUTTED ONLY ON 1ST PASS.

LOCATION 230 - SAME AS 220 START BUT BYPASS TEST 16 (N SQUARE)

LOCATION 260 - RUN MODULE TEST ...DEFAULT MODE ONLY.
THIS SKIPS OVER THE FOLLOWING TESTS:

1. TEST 35 FORMAT PACK
2. TEST 36 DECREMENT FROM CYL 410 TO 0 & READ HEADERS
3. TEST 40 SEEK FROM CYL 0 TO ALL
4. TEST 41 SEEK FROM CYL 410 TO ALL

THE PURPOSE OF BYPASSING IS TO PROVIDE
A QUICK MODULE TEST

LOCATION 270 - SAME AS 260 START BUT BYPASS TEST 16 ALSO.

IMPORTANT: FOR VARIATIONS OF THE ABOVE, SEE XXDP, ACT/APT
CONSIDERATIONS IN SECTIONS 3.2 & 3.3.

4.3 SWITCH REGISTER

THE SWITCHES ARE USED TO PROVIDE CONTROL FUNCTIONS.

SWITCH	FUNCTION
15	HALT ON ERROR
14	LOOP ON TEST
13	INHIBIT ERROR TYPEOUT
12	BYPASS DRIVE AFTER 20 ERRORS
11	INHIBIT ITERATION
10	BELL ON ERROR
9	LOOP ON ERROR
8	LOOP ON TEST IN SW<07:00>

4.3.1 SW<15>

THE PROGRAM HALTS ON ENCOUNTERING AN ERROR, AFTER TYPING OUT
THE ERROR MSG AND PERTINENT INFORMATION, IF SW13=0.
PRESSING "CONTINUE" RESTORES NORMAL OPERATION OF THE PROGRAM.

4.3.2 SW<14>

THE PROGRAM LOOPS ON THE TEST THAT IS BEING EXECUTED WHEN
THE SWITCH IS PUT ON. THIS SWITCH IS NORMALLY USED ALONG
WITH SW15.

4.3.3 SW<13>

THIS SWITCH INHIBITS ALL ERROR MSGS. NORMALLY USED WHEN
LOOPING ON TEST (SW14) OR LOOPING ON ERROR (SW9).

4.3.4 SW<12>

THIS SWITCH BYPASSES A GIVEN DRIVE AFTER 20 ERRORS HAVE
BEEN DETECTED.

4.3.5 SW<11>

EACH TEST WILL BE EXECUTED ONLY ONCE. NORMALLY AFTER THE
FIRST PASS, EACH SUBTEST IS ITERATED A NUMBER OF TIMES
(USUALLY 50. 5 IN SOME CASES). SETTING THIS SWITCH INHIBITS
ITERATIONS, SO THAT QUICK PASSES CAN BE MADE.

4.3.6 SW<10>

RINGS A BELL ON ERROR. USEFUL WHEN ERROR TYPEOUT IS INHIBITED.

4.3.7 SW<09>

THIS SWITCH PROVIDES THE TIGHTEST POSSIBLE SCOPE LOOP FOR
ERRORS. IF THE PROGRAM DETECTS AN ERROR, IT WILL LOOP BACK
TO THE BEGINNING OF TEST.

4.3.8 SW<08>

THIS SWITCH IS USED TO SELECT A PARTICULAR TEST (AS PER
SW<00-7>) FOR EXECUTION AND SUBSEQUENT LOOPING. THUS IF
TEST 15 IS TO BE SELECTED THE SWITCH SETTING WOULD BE
000415. IT SHOULD BE NOTED THAT BEFORE SELECTING TEST 15,
ALL THE PREVIOUS TESTS (1-14) WILL BE EXECUTED.

4.4 'SOFTWARE' SWITCH REGISTER

IF THE PROGRAM IS BEING RUN ON A SWITCHLESS PROCESSOR (I.E. AN 11/04 OR 11/34)
THE PROGRAM WILL DETERMINE THAT THE HARDWARE SWITCH REGISTER IS
NOT PRESENT AND WILL USE A 'SOFTWARE' SWITCH REGISTER. THE
'SOFTWARE' SWITCH REGISTER IS LOCATED AT LOCATION 176 (8). THE
SETTINGS OF THE "SOFTWARE" SWITCHES ARE CONTROLLED THROUGH
A KEYBOARD ROUTINE WHICH IS CALLED BY TYPING A 'CONTROL G'.
THE PROGRAM WILL RECOGNIZE THE 'CONTROL G' AT ANY TIME EXCEPT
WHEN THE PROGRAM IS AT A HIGHER PRIORITY PROCESSING AN RK06 INTERRORUPT.
THE 'SOFTWARE' SWITCH VALUES ARE ENTERED AS AN OCTAL NUMBER
IN RESPONSE TO THE PROMPT FROM THE SWITCH ENTRY ROUTINE:

```
<      SWR = NNNNNN     NEW =
```

EACH TIME SWITCH SETTING ARE ENTERED, THE ENTIRE SWITCH
REGISTER IMAGE MUST BE ENTERED. LEADING ZEROS ARE NOT
REQUIRED., 'RUBOUT' AND 'CONTROL U' FUNCTIONS MAY BE USED TO
CORRECT TYPING ERRORS DURING SWITCH ENTRY.

ON PROCESSORS WITH HARDWARE SWITCH REGISTERS, THE 'SOFTWARE'
SWITCH REGISTER MAY BE USED. IF THE PROGRAM FINDS ALL 16
SWITCHES IN THE 'UP' POSITION, ALL SWITCH REGISTER REFERENCES
WILL BE TO THE 'SOFTWARE' REGISTER AND THE PROCEDURES DESCRIBED
ABOVE MUST BE FOLLOWED.

4.5 INPUT DIALOGUE

THE DIALOGUE WILL BE DONE INTERACTIVELY. THE PROGRAM WILL REQUEST A PARAMETER BY CONSOLE TYPEOUT. THE PARAMETER MAY THEN BE ENTERED AS SPECIFIED BELOW OR ALLOWED TO DEFAULT BY A CARRIAGE RETURN. UNRECOGNIZED OR ILLEGAL RESPONSES WILL BE ECHOED BACK FOLLOWED BY "?". THE PROPER RESPONSE MAY THEN BE ENTERED.

IMPORTANT: FOR VARIATIONS OF THE ABOVE, SEE XXDP, ACT/APT CONSIDERATIONS IN SECTIONS 3.2 & 3.3.

4.5.1 DRIVE SELECTION

THE REQUEST WILL BE:

DRIVES TO BE TESTED:

THE DEFAULT RESPONSE IS CARRIAGE RETURN TO TEST ALL DRIVES IN THE 'DRIVE PRESENT' CONDITION.

THE OPERATOR CAN ALSO TYPE IN THE SPECIFIC DRIVE NUMBERS TO BE TESTED, SEPARATED BY COMMAS & TERMINATED BY A CARRIAGE RETURN.

E.G. DRIVES TO BE TESTED: 1,2,4,6

IMPORTANT: FOR VARIATIONS OF THE ABOVE, SEE XXDP, ACT/APT CONSIDERATIONS IN SECTIONS 3.2 & 3.3.

4.5.2 BUS ADDRESS

THE REQUEST WILL BE:

TYPE IN BUSS ADDRESS IF NOT 177440

THE DEFAULT IS A CARRIAGE RETURN

4.5.3 CONTROLLER INTERRORUPT VECTOR

THE REQUEST WILL BE:

TYPE IN CONTROLLER INTERRORUPT VECTOR IF NOT 210

THE DEFAULT IS A CARRIAGE RETURN.

4.5.4 EXAMPLE OF PROGRAM DIALOGUE

THE EXAMPLE SHOWN IS FOR A PROGRAM STARTED AT ADDRESS 220.
ALL OPERATOR RESPONSES ARE UNDERLINED.

```
UNIBUS RK06 DRIVE DIAGNOSTIC
    PART 1
MAINDEC-11-DZR6H-C-PB
```

```
                        DRIVES TO BE TESTED: 1,3<CR>
                                             -------

                        TYPE IN BUSS ADDRESS IF NOT 177440 <CR>
                                                   ----

                        TYPE IN CONTROLLER INTERRORUPT VECTOR IF NOT 210 <CR>
                                                                     ----

                        WILL TEST DRIVES:
                        1
                        3

                        DRIVE 1

                        (THE REST IS IDENTICAL TO THE EXAMPLE SHOWN IN 4.6 BELOW)


4.6     PROGRAM EXAMPLE

        THE FOLLOWING IS AN EXAMPLE OF A PROGRAM STARTED AT THE
        DEFAULT ADDRESS (200) & WITH 2 DRIVES ON THE LINE.

                        UNIBUS RK06 DRIVE DIAGNOSTIC
                           PART 1
                        MAINDEC-11-DZR6H-C-PB

                        WILL TEST DRIVES:
                        0
                        1

                        DRIVE 0

                        DRIVE SERIAL NO. AAA
                        CARTRIDGE SERIAL NO.; BBB

                        DRIVE 1

                        DRIVE SERIAL NO. CCC
                        CARTRIDGE SERIAL NO. DDD

                        END PASS #1


                        WILL TEST DRIVES:
                        0
                        1

                        DRIVE 0

                        DRIVE SERIAL NO. AAA
                        CARTRIDGE SERIAL NO. BBB

                        DRIVE 1
```

```
                        DRIVE SERIAL NO. CCC
                        CARTRIDGE SERIAL NO. DDD

                        END PASS # 2

                           (ETC)

                THE ABOVE ASSUMES NO ERRORS DETECTED.
                THE NUMBER OF PASSES IS DETERMINED BY ACT/APT/XXDP

                IMPORTANT:  FOR VARIATIONS OF THE ABOVE, SEE XXDP, ACT/APT
                            CONSIDERATIONS IN SECTIONS 3.2 & 3.3.

4.7     HALTING THE PROGRAM

                THE PROGRAM PROVIDES A METHOD OF HALTING ITSELF SUCH THAT
                THE CARTRIDGE AND/OR DRIVE IS NOT LEFT IN ON UNDETERMINED
                STATE; IE: HEADS UNLOADED OR INVALID FORMAT.

                TO PROPERLY HALT, TYPE CONTROL-C (↑C) ON THE CONSOLE.

                IF HEADS ARE LOADED & FORMATTING IS VALID,
                THE PROGRAM WILL:

                1.  ECHO ↑C
                2.  TYPE "CPU HALTED"
                3.  HALT THE PROGRAM

                IF HEADS ARE NOT LOADED AND/OR FORMATTING IS INVALID,
                THE PROGRAM WILL:

                1.  ECHO ↑C
                2.  TYPE 'HALT PENDING, PLEASE WAIT'
                3.  DO THE TEST(S) THAT LOADS HEADS AND/OR FORMATS
                    THE INVALID CYLS
                4.  TYPE 'CPU HALTED'
                5.  HALT THE PROGRAM


                NOTES:

                1.  THE ABOVE EXAMPLE IS FOR THE PROGRAM RUNNING IN DUMP
                    MODE (MANUAL).  IF THE PROGRAM IS RUNNING IN CHAIN/AUTO
                    MODE VIA XXDP,ACT,APT;  IT WILL FIRST LOAD HEADS
                    AND/OR FORMAT CORRECTLY,  IF REQ'D, THEN IT WILL
                    JUMP ON TO THE MONITOR WHERE THE NEXT PROGRAM CAN BE
                    CALLED IN.

                    THE TYPEOUTS WILL BE "ABORT PENDING - PLEASE WAIT"
                                      &  "PROGRAM ABORTING"

                2.  OPERATING THE 'CONTINUE' SWITCH ON THE CPU CONSOLE WILL RETURN THE
                    PROGRAM TO TEST 1 WHERE TESTING WILL BEGIN WITH THE 1'ST DRIVE AGAIN.


5.0     DRIVE DIAGNOSTIC FUNCTIONAL DESCRIPTION
```

5.1 GENERAL

A. BASIC CONTROLLER TESTS, SIZING & SETUP

THESE TESTS DO BASIC CONTROLLER REGISTER REFERENCE TESTS, CHECKS OPERATOR INPUTS AGAINST DRIVES SEEN ON THE LINE OR DEFAULTS TO TEST ALL THE DRIVES SEEN ON THE LINE. IT CHECKS THE EXISTENCE OF AN L OR P CLOCKS FOR USE IN THE TIMING TESTS.

B. STATIC & CYCLE UP TESTS

THESE TESTS CHECK OUT THE ABILITY TO SELECT & DESELECT THE DRIVE; TO DETECT PARITY, UNSAFE, AND FAULT CONDITIONS WITH THE DRIVE READY TO OPERATE BUT WITHOUT THE SPINDLE ON.

THE ENTIRE POWER UP SEQUENCE IS TESTED BY VERIFYING ALL STATUS BITS SET/RESET IN PROPER SEQUENCE: THE BRUSH CYCLE, INNER-OUTER LIMIT DETECTION, FORWARD, REVERSE, PIP...ETC STATUS BITS ARE CHECKED.

C. SEEK, WRITE HEADER, READ HEADER TESTS

THESE TESTS CHECK THE ABILITY OF THE DRIVE TO DO SEEKS, HEADER OPERATIONS & 20, 22 SECTOR FORMATTING.

5.2 TEST DESCRIPTIONS

```
;*******************************************************************
;BASIC CONTROLLER TESTS, SIZING & SETUP
;*******************************************************************
```

TEST 1 REFERENCE ALL CONTROLLER REGISTERS

THIS TEST VERIFIES THAT ALL THE CONTROLLER REGISTERS CAN BE ACCESSED. THE INABILITY TO BE ACCESSED WILL RESULT IN A TIMEOUT TRAP WITH AN ERROR MSG. ANY ERROR IN THIS TEST WILL RESULT IN ABORTING ALL OTHER TESTS AND JUMPING TO 'END OF PASS'

TEST 2 SIZE THE BUSS

THIS TEST IS ENTERED ONLY IF 'DRIVE SELECTION' IS DEFAULTED EITHER BY RUNNING IN THE AUTO MODE OR A 200 START IN THE MANUAL MODE.
EVERY DRIVE FROM 0 THRU 7 IS ADDRESSED.
CONTROLLER ERROR (CERR) IS EXAMINED AND IF NOT SET, THE DRIVE WILL BE TESTED. IF SET, THE PROGRAM WILL BYPASS TESTING THAT DRIVE ONLY IF THE ERROR WAS A RESULT OF MDS, UFE OR NED BEING SET; OR BOTH NED & DRA RESET INDICATING THE OTHER PORT IS ACCESSED.

TEST 3 VERIFY OPERATOR DRIVE SELECTIONS

THIS TEST IS ENTERED ONLY IF DRIVE SELECTION IS NOT
DEFAULTED. EVERY DRIVE FROM 0 TO 7 IS ADDRESSED &

CONTROLLER ERROR (CERR) IS EXAMINED. IF NOT SET, THE
PROGRAM WILL ASSUME THE DRIVE IS PRESENT. IT WILL THEN CHECK
TO SEE THAT THE DRIVE WAS INPUTTED FOR TESTING. IF NOT, IT WILL
BE AN ERROR. IF CERR WAS SET, THAT DRIVE WILL BE BYPASSED
ONLY IF THE ERROR WAS A RESULT OF MDS OR UFE SET OR BOTH
NED & DRA RESET (WRONG PORT). IF CERR IS A RESULT OF
NED ONLY, IT IS CHECKED AGAINT THE INPUTTED INFOR TO
VERIFY IT WAS NOT SPECIFIED.

TEST 4 FIND NEXT DRIVE TO BE TESTED

THIS TEST FINDS THE NEXT DRIVE PRESENT & PUTS THAT
ADDRESS IN 'DRVAD'.
THROUGHOUT THE FOLLOWING TESTS, THE DRIVE TESTED IS
THE DRIVE WHOSE ADDRESS IS IN 'DRVAD'.

TEST 5 UNLOAD DRIVE TO BE TESTED

THIS TEST UNLOADS THE DRIVE TO BE TESTED NEXT,
WAITS FOR ATTN & VERIFIES IT CAME FROM THE CORRECT DRIVE.
IT THEN WAITS FOR SPEED OK TO GO LOW BEFORE
PROCEEDING TO THE NEXT TEST.

****
STATIC & CYCLE UP TESTS
****

TEST 6 REFERENCE & CHECK ALL STATUS BYTES IN RKMR2 & RKMR3

CHECKS THE ABILITY TO REFERENCE ALL
DRIVE REGISTERS AND THAT THEY CONTAIN CORRECT STATUS.

TEST 7 PRINT DRIVE SERIAL NUMBER

THIS TEST READS & PRINTS THE DRIVE SERIAL # FROM MSG A, WORD 11
IN DECIMAL & IS PERFORMED ON THE 1ST PASS ONLY

TEST 10 SET VV WITH PACK CMD

IF VV IS RESET, THE PACK CMD IS USED TO SET IT.

TEST 11 RELEASE DRIVE

```
                        TESTS THE ABILITY TO RECOGNIZE THE RLS BIT AND NOT RAISE SACK


                TEST 12 DRIVE TYPE TEST

                        THIS TEST COMPARES DRIVE TYPE IN MSG A AGAINST 'DDT' IN RKDS.
                        WRONG CDT IN RKCS1 IS SENT & ERRORS ARE VERIFIED.


                TEST 13 C-D PARITY ERROR DETECTION

                        TESTS THE ABILITY OF THE DRIVE TO DETECT EVEN PARITY SENT BY
                        THE CONTROLLER BY SETTING 'PAT' ON RKMR1.
                        THE DRIVE SHOULD RESPOND WITH 'C-D PARITY ERROR'
                        THE DRIVE STILL SENDS ODD PARITY TO THE CONTROLLER WHICH IS NOW
                        CHECKING FOR EVEN PARITY THEREFORE THE CONTROLLER SHOULD DETECT
                        AN ERROR AND SET SPAR.
                        THE ERROR CONDITION IS RESET WITH THE CLEAR CMD


                TEST 14 VERIFY START SPINDLE CMD

                        THE PROGRAM CHECKS THE ENTIRE STARTUP SEQUENCE, IE:
                        BRUSH CYCLE, HEADS HOME, FWD, REV ETC.
                        BY VERIFYING ALL APPROPRIATE STATUS BITS FOR PROPER SEQUENCING.
                        THE CYL ADDRESS & CYL DIFFERENCE REGS ARE CHECKED
                        TO BE ZERO AT THE END OF THE SEQUENCE.


                ;*****************************************************************
                ;SEEK/READ HEADER/WRITE HEADER TESTS
                ;*****************************************************************


                TEST 15 STATIC CYL DIFF AND CYL ADDR REG TEST; PART 1

                        THIS TEST CHECKS EACH BIT OF THE CYL DIFFERENCE
                        AND CYL ADDRESS REGISTERS BY PERFORMING SEEKS TO ALL
                        MAJOR CYLS (0,1,2,4,8,16,32,64,128,256) WITH EVEN PARITY SET.
                        THIS FREEZES THE INFORMATION IN THE ABOVE REGISTERS & ALLOWS FOR CHECKIN
                        THIS TEST VERIFIES C-D PARITY ERROR BIT SET, THAT HEADS DID
                        NOT MOVE & ALL OTHER APPLICABLE STATUS BITS & REGS.


                TEST 16 STATIC CYL DIFF & CYL ADDR REG TEST-PART 2

                        THIS TEST CHECKS THE ABILITY OF THE DRIVE TO PROPERLY SET THE CYL
                        DIFF. & CYL ADDR REGS FOR ALL COMBINATIONS BY SEEKING TO
                        ALL CYLS FROM EVERY OTHER CYL. (N SQUARE SEEKS).
                        IT IS PERFORMED IN THE SAME MANNER AS THE ABOVE TEST.


                TEST 17 HEAD REGISTER TEST

                        THIS TEST CHECKS THE ABILITY TO SELECT ALL HEADS (0,1,2)
                        VIA RKDA & READING BACK FROM MSG B3 BY THE SELECT DRIVE CMD.
```

```
                        HEAD 3 IS CHECKED TO PRODUCE INV. ADDR.

                        SINCE CHANGING HEAD ADDRESSES ARE TIED TO SEEK CMDS,
                        SELECTING HEAD 3 MUST RESULT IN A SEEK INCOMPLETE ALONG WITH
                        ILLEGAL ADDRESS. IF NOT,THIS MEANS THAT CHANGING HEAD ADDRESSES
                        ARE NOT TIED TO SEEK CMDS


                TEST 20 SEEK TO CYL 0

                        TESTS THE ABILITY TO DO A SEEK CMD.
                        VERIFIES THERE WAS NO MOVEMENT BY CHECKING ALL APPROPRIATE
                        STATUS BITS.  VERIFIES CMD COMPLETION BETWEEN 10-15USEC.
                        READ HEADER IS NOT PERFORMED AS THE PACK MAY NOT BE FORMATTED.


                TEST 21 TEST SECTOR COUNT REG. FOR 22 & 20 SECTOR FORMAT


                TEST 22 DETECT OUTER LIMIT

                        THIS TEST VERIFIES THAT THE ABOVE TEST DID ACTUALLY POSITION ON CYL 0
                        BY DETECTING OUTER LIMIT AS THE ADJACENT CYL.
                        AN ERROR IN THIS TEST INDICATES:

                                A.  HEADS WERE NOT ON CYL 0
                        AND/OR  B.  COULD NOT SEEK IN REVERSE DIRECTION.


                TEST 23 READ HEADERS, ALL TRACKS, CYL 0

                        THIS TEST DOES NOT CHECK THE HEADERS, BUT ONLY THE FACT
                        THAT HEADERS CAN BE READ CORRECTLY BY CHECKING CERR & DTE.

                        THIS TEST IS VALID ONLY IF THE PACK HAS NOT BEEN ZERO'D OUT.


                TEST 24 BASIC WRITE/READ HEADER & HEAD SWITCHING TEST

                        THIS TEST CHECKS HEAD SWITCHING BY WRITING UNIQUE HEADERS
                        ON EACH TRACK OF CYL 0, READING BACK & VERIFYING THEY REMAINED
                        UNIQUE. 22 SECTOR FORMAT IS USED

                        I.E.    TRACK 0: ALL 0'S FOR ALL SECTOR HEADERS
                                TRACK 1: 0101 FOR ALL SECTOR HEADERS
                                TRACK 2: ALL 1'S FOR ALL SECTOR HEADERS


                TEST 25 BASIC WRITE/READ HEADER TEST; ALL 1'S, 20 SECTORS

                        USING HEAD 0, WRITE & READ 20 SECTOR HEADERS BY WRITING ALL
                        1'S AS HEADERS.  ATTEMPT TO FIND SECTORS 20 & 21.  VERIFY
                        THEY ARE NO LONGER THERE BY READING 22 SECTORS AND NOT
                        FINDING 0'S AS DATA FROM THE PREVIOUS TEST.
```

```
                        TEST 26 WRITE & READ HEADERS CYL 0, HEAD 0


                        TEST 27 SEEK FROM CYL 0 TO 1 & READ HEADERS

                                THIS TEST CHECKS MSG A & B WORDS 0,1,2 FOR CORRECT STATUS AFTER RDY
                                IS RECEIVED FROM A SEEK CMD TO DETERMINE
                                THAT THE HEADS ARE ACTUALLY MOVING & THE CYL DIFF IS 1.
                                AFTER ATTN IS RECEIVED, CERR IS EXAMINED FOR ANY ERRORS.
                                CYL DIFFERENCE IN MSG A2 IS VERIFIED TO BE 0 & CYL ADDR
                                IN MSG B2 IS VERIFIED TO BE 1.

                                HEADERS ARE READ FROM 1 SECTOR, HEAD 0 & VERIFIED THAT THEY ARE
                                DIFFERENT FROM CYL 0 TO SHOW THAT THE HEADS DID ACTUALLY MOVE.


                        TEST 30 WRITE & READ HEADERS CYL 1, HEAD 0


                        TEST 31 TEST RECALIBRATE CMD & READ HEADERS

                                THIS TEST DOES A RECALIBRATE & READS HEADERS.
                                IT VERIFIES THAT WRITING HEADERS ON CYL 1 FROM THE PREVIOUS
                                TEST DID NOT OVERWRITE CYL 0 HEADERS.

                                AN ERROR IN THIS TEST INDICATES THAT HEADS:


                                        A. MOVED TO A CYL OTHER THAN 1
                                OR      B. DID NOT GET BACK TO CYL 0


                TEST 32 SINGLE INCREMENT SEEKS TO CYL 410

                        THIS TEST DOES SINGLE INCREMENT SEEKS OUT TO CYL 410
                        WITHOUT ANY WRITING OR READING SO AS NOT TO INADVERTENTLY
                        DESTROY DATA.


                TEST 33 READ & SAVE BAD SECTOR INFO & TYPE PACK SERIAL #

                        THIS TEST VERIFIES THAT CYL 410, TRACK 2 CAN BE READ.
                        THIS AREA CONTAINS BAD SECTOR INFO WHICH IS WRITTEN BY THE
                        FACTORY DURING MANF.  ALL BAD SECTOR INFO (BSE) WILL BE STORED
                        AT THIS TIME TO MASK FUTURE READ HEADER OR DATA ERROR PRINTOUTS.
                        IF BSE INFO CANNOT BE READ, OR IF AFTER READING THE BSE INFO
                        IT IS DETERMINED THAT AN ALIGNMENT CARTRIDGE IS USED,
                        A MSG WILL BE TYPED INDICATING THAT ALL
                        FUTURE FORMAT AND READ-WRITE TESTS WILL BE BYPASSED.
                        THIS IS DONE SO AS NOT TO DESTROY BSE INFO OR AN ALIGNMENT PACK BY WRITI

                        THE PACK SERIAL # IS TYPED IN OCTAL & FOR THE FIRST PASS ONLY.

                        THIS IS THE FIRST TEST WHERE THE READ DATA CMD IS PERFORMED
```

```
                        TEST 34 DETECT INNER LIMIT

                                THIS TEST VERIFIES THAT THE LAST CYL IN THE ABOVE
                                TEST WAS 410 BY DETECTING INNER LIMIT AS THE ADJACENT CYL.
                                IF THIS TEST FAILS, IT INDICATES THAT HEADS WERE NOT ON CYL 410
                                & THAT BSE INFO IS NOT VALID.  THE FORMAT PACK TEST
                                & ALL READ-WRITE TESTS ARE BYPASSED
                                TO AVOID DESTROYING BSE INFO OR AN ALIGNMENT CARTRIDGE
                                SINCE THERE IS A SEEKING OR LIMIT DETECTION PROBLEM.


                        TEST 35 FORMAT PACK

                                THIS TEST FORMATS THE ENTIRE PACK IN 22 SECTOR FORMAT BY
                                DOING 1 CYL INCREMENTAL SEEKS
                                FROM 0 TO 410 WITH WRITE HEADER CMDS (ALL TRACKS).
                                HEADERS WILL BE READ IN THE NEXT TEST


                        TEST 36 DECREMENT FROM CYL 410 TO 0 & READ HEADERS

                                THIS TEST VERIFIES MOTION IN THE NEGATIVE DIRECTION BY
                                SINGLE CYL INCREMENTAL SEEKS.


                        TEST 37 SEEK FROM CYL 0 TO ALL MAJOR CYLS & READ HEADERS

                                THIS TEST SEEKS FROM CYL 0 TO ALL THE MAJOR CYLS & READS HEADERS.
                                IT THEN SEEKS CYL 0 & READS HEADERS.

                                MAJOR CYLS ARE: 1 (DECIMAL)  =  1 (OCTAL)
                                                2               2
                                                4               4
                                                8               10
                                                16              20
                                                32              40
                                                64              100
                                                128             200
                                                256             400


                        TEST 40 SEEK TO ALL CYLS FROM 0 & READ HEADERS


                        TEST 41 SEEK TO ALL CYLS FROM CYL 410 & READ HEADERS


                        TEST 42 SEEK TO ALL KEY INVALID CYLS

                                THIS TEST VERIFIES THAT 'INV ADDR' & 'SEEK INCOMPLETE' IS
                                PRODUCED & THAT HEADS DO NOT MOVE OR UNLOAD IF AN ILLEGAL
                                CYL IS SPECIFIED IN A SEEK.

                                INVALID CYLS ARE 411 THRU 511 (10)  IE. 633 THRU 777 (8)

                                THIS TEST CHECKS KEY INVALID CYLS 411,412,416,448 & 480
```

FOR A FULL LOGIC TEST

THE PROGRAM DOES NOT REQUIRE FORMATTED PACKS AS FORMATTING IS PERFORMED IN ANY CASE.

ANY TEST THAT MODIFIES STANDARD FORMATTING IS FOLLOWED BY A 'CLEAN UP' TEST TO PUT THOSE CYLS BACK TO STANDARD FORMAT.

6.0 ERROR REPORTING

6.1 ERROR INTERPRETATION

WHENEVER AN ERROR MSG IS PRINTED OUT, ALL REGISTERS AND OTHER DATA PERTAINING TO THE ERROR ARE ALSO GIVEN. MSG A(00), MSG B(01), RKER, RKBA...ETC, INDICATE THE CONTENTS OF THE CORRESPONDING REGISTERS AT THE TIME OF ERROR.

EVERY ERROR MSG CONTAINS A PC. THIS PC INDICATES THE POSITION IN PROGRAM WHERE THE ERROR CALL IS LOCATED. THE ERROR MSG, BECAUSE OF PRACTICAL CONSIDERATIONS IS MADE SHORT AND MEANINGFUL. THE USER IS ADVISED TO LOOK UP THE PC IN THE PROGRAM LISTING, WHERE HE WILL FIND MORE INFORMATION ABOUT THE ERROR. IN MANY INSTANCES, A SINGLE FAULT WILL GIVE RISE TO MORE THAN ONE ERROR REPORT. A LITTLE DELIBERATION AND CAREFUL EXAMINATION OF THE DATA GIVEN WILL BE CERTAINLY VERY HELPFUL IN PINPOINTING THE FAULT. A BRIEF EXPLANATION OF WHAT IS BEING CHECKED IN THE TEST IS GIVEN AT THE BEGINNING OF EVERY TEST. ALL THE NUMBERS GIVEN WITH ERROR MSGS ARE IN OCTAL.

NOTE

NO ERROR LOGGING OR OPERATION HISTORY IS PROVIDED.

6.2 ERROR PRINTOUT EXAMPLES:

EXAMPLE #1:

MSG A0 ERROR
AFTER START SPINDLE CMD & FWD SET

TEST NO. PC
000014 016530

EXPECT A0	EXPECT B0	EXPECT A1	EXPECT B1	EXPECT A2	EXPECT B2	EXPECT B3
030144	100000	013704	000001			
ACTUAL A0	ACTUAL B0	ACTUAL A1	ACTUAL B1	ACTUAL A2	ACTUAL B2	ACTUAL B3

```
                        140144  100000  101744  000001
                        RKCS1   RKCS2   RKASOF  RKER    RKDS    RKDC
                        040200  000100  010000  000000  000000  000000

                        THE ABOVE EXAMPLE SHOWS EXPECTED & ACTUAL DATA FOR
                        MSG REGISTERS A0, B0, A1 & B1.

                        MSGS A2, B2 & B3 WILL BE TYPED OUT ONLY AS
                        REQUIRED IF THE CYL DIFFERENCE/OFFSET, CYL
                        ADDRESS & HEAD & SECTOR INFORMATION IS A VARIABLE PARAMETER
                        OF THE TEST.

                        EXAMPLE #2:

                        NO ATTN IN RKASOF
                        AFTER UNLOAD CMD

                          TEST NO.  PC
                          000003  014330
                        RKMR2   RKMR3   RKER    RKDS    RKCS1   RKCS2   RKASOF
                        000144  100000  000000  100101  000206  000104  000000


                                [ END OF DOCUMENT ]

%
```

```
                        .NLIST  CND,MC,MD
                        .LIST   ME
                        .ENABL  ABS,AMA

                        ;DEFINE SYSMAC MACROS

        167400          $SWR=   167400                  ;DEFINE SWITCHES 15,14,13,11,10,9,8
        000001          $TN=    1                       ;SET FIRST TEST NO. TO 1


                        .TITLE  UNIBUS RK06 DRIVE DIAGNOSTIC  PART 1
                        ;*COPYRIGHT (C) 1976
                        ;*DIGITAL EQUIPMENT CORP.
                        ;*MAYNARD, MASS. 01754
                        ;*
                        ;*PROGRAM BY GARY PAPAZIAN
                        ;*
                        ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                        ;*PACKAGE (MAINDEC-11-DZQAC-C2), SEPT 14, 1976.
                        ;*


                        .SBTTL  OPERATIONAL SWITCH SETTINGS
                        ;*
                        ;*      SWITCH                  USE
                        ;*      ------          --------------------
                        ;*        15            HALT ON ERROR
                        ;*        14            LOOP ON TEST
                        ;*        13            INHIBIT ERROR TYPEOUTS
                        ;*        12            ABORT DRIVE AFTER 20 ERRORS
                        ;*        11            INHIBIT ITERATIONS
                        ;*        10            BELL ON ERROR
                        ;*         9            LOOP ON ERROR
                        ;*         8            LOOP ON TEST IN SWR<7:0>


                        .SBTTL  SUMMARY OF STARTING LOCATIONS
                        ;*
                        ;*
                        ;*              200     DEFAULT PARAMETERS
                        ;*              204     DEFAULT PARAMETERS & BYPASS TEST 16
                        ;*              220     INPUT PARAMETERS
                        ;*              230     INPUT PARAMETERS & BYPASS TEST 16
                        ;*              260     RUN MODULE TEST VERSION-DEFAULT MODE ONLY BYPASS
                        ;*                      TESTS 35,36,40 & 41
                        ;*              270     SAME AS 260 START BUT BYPASS TEST 16 ALSO
                        ;*
```

```
                        .SBTTL  BASIC DEFINITIONS

                        ;*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
000100                  STACK=  1100
                        .EQUIV  EMT,ERROR       ;;BASIC DEFINITION OF ERROR CALL
                        .EQUIV  IOT,SCOPE       ;;BASIC DEFINITION OF SCOPE CALL

                        ;*MISCELLANEOUS DEFINITIONS
000011                  HT=     11              ;;CODE FOR HORIZONTAL TAB
000012                  LF=     12              ;;CODE FOR LINE FEED
000015                  CR=     15              ;;CODE FOR CARRIAGE RETURN
000200                  CRLF=   200             ;;CODE FOR CARRIAGE RETURN-LINE FEED
177776                  PS=     177776          ;;PROCESSOR STATUS WORD
                        .EQUIV  PS,PSW
177774                  STKLMT= 177774          ;;STACK LIMIT REGISTER
177772                  PIRQ=   177772          ;;PROGRAM INTERRUPT REQUEST REGISTER
177570                  DSWR=   177570          ;;HARDWARE SWITCH REGISTER
177570                  DDISP=  177570          ;;HARDWARE DISPLAY REGISTER

                        ;*GENERAL PURPOSE REGISTER DEFINITIONS
000000                  R0=     %0              ;;GENERAL REGISTER
000001                  R1=     %1              ;;GENERAL REGISTER
000002                  R2=     %2              ;;GENERAL REGISTER
000003                  R3=     %3              ;;GENERAL REGISTER
000004                  R4=     %4              ;;GENERAL REGISTER
000005                  R5=     %5              ;;GENERAL REGISTER
000006                  R6=     %6              ;;GENERAL REGISTER
000007                  R7=     %7              ;;GENERAL REGISTER
000006                  SP=     %6              ;;STACK POINTER
000007                  PC=     %7              ;;PROGRAM COUNTER

                        ;*PRIORITY LEVEL DEFINITIONS
000000                  PR0=    0               ;;PRIORITY LEVEL 0
000040                  PR1=    40              ;;PRIORITY LEVEL 1
000100                  PR2=    100             ;;PRIORITY LEVEL 2
000140                  PR3=    140             ;;PRIORITY LEVEL 3
000200                  PR4=    200             ;;PRIORITY LEVEL 4
000240                  PR5=    240             ;;PRIORITY LEVEL 5
000300                  PR6=    300             ;;PRIORITY LEVEL 6
000340                  PR7=    340             ;;PRIORITY LEVEL 7

                        ;*"SWITCH REGISTER" SWITCH DEFINITIONS
100000                  SW15=   100000
040000                  SW14=   40000
020000                  SW13=   20000
010000                  SW12=   10000
004000                  SW11=   4000
002000                  SW10=   2000
001000                  SW09=   1000
000400                  SW08=   400
000200                  SW07=   200
000100                  SW06=   100
000040                  SW05=   40
000020                  SW04=   20
000010                  SW03=   10
000004                  SW02=   4
```

```
                        SW01=   2
                        SW00=   1
                        .EQUIV  SW09,SW9
                        .EQUIV  SW08,SW8
                        .EQUIV  SW07,SW7
                        .EQUIV  SW06,SW6
                        .EQUIV  SW05,SW5
                        .EQUIV  SW04,SW4
                        .EQUIV  SW03,SW3
                        .EQUIV  SW02,SW2
                        .EQUIV  SW01,SW1
                        .EQUIV  SW00,SW0

                        ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
100000                  BIT15=  100000
040000                  BIT14=  40000
020000                  BIT13=  20000
010000                  BIT12=  10000
004000                  BIT11=  4000
002000                  BIT10=  2000
001000                  BIT09=  1000
000400                  BIT08=  400
000200                  BIT07=  200
000100                  BIT06=  100
000040                  BIT05=  40
000020                  BIT04=  20
000010                  BIT03=  10
000004                  BIT02=  4
000002                  BIT01=  2
000001                  BIT00=  1
                        .EQUIV  BIT09,BIT9
                        .EQUIV  BIT08,BIT8
                        .EQUIV  BIT07,BIT7
                        .EQUIV  BIT06,BIT6
                        .EQUIV  BIT05,BIT5
                        .EQUIV  BIT04,BIT4
                        .EQUIV  BIT03,BIT3
                        .EQUIV  BIT02,BIT2
                        .EQUIV  BIT01,BIT1
                        .EQUIV  BIT00,BIT0

                        ;*BASIC "CPU" TRAP VECTOR ADDRESSES
000004                  ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
000010                  RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
000014                  TBITVEC=14              ;;"T" BIT
000014                  TRTVEC= 14              ;;TRACE TRAP
000014                  BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
000020                  IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
000024                  PWRVEC= 24              ;;POWER FAIL
000030                  EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
000034                  TRAPVEC=34              ;;"TRAP" TRAP
000060                  TKVEC=  60              ;;TTY KEYBOARD VECTOR
000064                  TPVEC=  64              ;;TTY PRINTER VECTOR
000240                  PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR

                        .SBTTL  RK06 CONTROLLER REGISTER DEFINITION
```

```
                        ;       $BASE=177440

000000                  RKCS1=  0               ;CONTROL AND STATUS REGISTER 1
000002                  RKWC=   2               ;WORD COUNT REGISTER
000004                  RKBA=   4               ;BUS ADDRESS REGISTER
000006                  RKDA=   6               ;DESIRED TRACK SECTOR REGISTER
000010                  RKCS2=  10              ;CONTROL AND STATUS REGISTER 2
000012                  RKDS=   12              ;DRIVE STATUS REGISTER
000014                  RKER=   14              ;ERROR REGISTER
000016                  RKASOF= 16              ;ATTENTION SUMMARY AND OFFSET REGISTER
000020                  RKDC=   20              ;DESIRED CYL REGISTER
000024                  RKDB=   24              ;DATA BUFFER
000026                  RKMR1=  26              ;MAINTENANCE REGISTER 1
000034                  RKMR2=  34              ;MAINTENANCE REGISTER 2 (MSG LINE A)
000036                  RKMR3=  36              ;MAINTENANCE REGISTER 3 (MSG LINE B)
000030                  RKECPS= 30              ;ECC POSITION INFORMATION
000032                  RKECPT= 32              ;ECC PATTERN INFORMATION

                        .SBTTL  CONTROL AND STATUS REGISTER 1 BITS (RKCS1:0)

                        ;       DRIVE CMDS

000001                  SELDRV= 1               ;SELECT DRIVE (GET STATUS)
000003                  PACK=   3               ;PACK ACKNOWLEDGE
000005                  CLEAR=  5               ;DRIVE CLEAR
000007                  UNLOAD= 7               ;UNLOAD
000011                  SRTSPL= 11              ;START SPINDLE
000013                  RECAL=  13              ;RECALIBRATE
000015                  OFFSET= 15              ;OFFSET
000017                  SEEK=   17              ;SEEK
000021                  RDDATA= 21              ;READ DATA
000023                  WRDATA= 23              ;WRITE DATA
000025                  RDHEAD= 25              ;READ HEADER
000027                  WRHEAD= 27              ;WRITE HEADER AND DATA
000031                  WRTCHK= 31              ;WRITE CHECK

000001                  GO=     BIT0            ;GO BIT
000100                  IE=     BIT6            ;INTERRORUPT ENABLE
000200                  RDY=    BIT7            ;CONTROLLER READY
000400                  BA16=   BIT8            ;BUS ADDRESS BIT 16
001000                  BA17=   BIT9            ;BUS ADDRESS BIT 17
002000                  CDT=    BIT10           ;CONTROLLER DRIVE TYPE (0=RK06)
004000                  CTO=    BIT11           ;CONTROLLER TIMEOUT
010000                  CFMT=   BIT12           ;CONTROLLER DRIVE FORMAT (0=22 SECTOR, 1=20 SECTOR)
020000                  DCPAR=  BIT13           ;SERCON PARITY ERROR DETECTED BY CONTROLLER
040000                  DI=     BIT14           ;DRIVE INTERRORUPT
100000                  CERR=   BIT15           ;CONTROLLER ERROR
100000                  CCLR=   BIT15           ;CONTROLLER CLEAR

                        .SBTTL  CONTROL AND STATUS REGISTER 2 BITS (RKCS2:10)

000007                  DRVMSK= 7               ;MASK FOR DRIVE SELECTION CODE
000010                  RLS=    BIT3            ;DESELECT OR RELEASE DRIVE IN BITS 0-2
000020                  BAI=    BIT4            ;BUS ADDRESS INCREMENT INHIBIT
000040                  SCLR=   BIT5            ;SUBSYSTEM CLEAR CONTROLLER AND ALL DRIVES
```

```
                        ;CONTROL AND STATUS REGISTER 2 BITS (RKCS2:10)

000100                  IR=     BIT6            ;INPUT READY
000200                  OR=     BIT7            ;OUTPUT READY
000400                  UFE=    BIT8            ;UNIT FIELD ERROR
001000                  MDS=    BIT9            ;MULTIPLE DRIVE SELECT
002000                  PGE=    BIT10           ;PROGRAMMING ERROR
004000                  NEM=    BIT11           ;NON-EXISTENT MEMORY
010000                  NED=    BIT12           ;NON-EXISTENT DRIVE
020000                  UPE=    BIT13           ;UNIBUS PARITY ERROR
040000                  WCE=    BIT14           ;WRITE CHECK ERROR
100000                  DLT=    BIT15           ;DATA LATE ERROR

                        .SBTTL  ERROR REGISTER BIT DEFINITION (RKER:14)

000001                  ILF=    BIT0            ;ILLEGAL FUNCTION CODE
000002                  SKI=    BIT1            ;SEEK INCOMPLETE
000004                  NXF=    BIT2            ;NON-EXECUTABLE FUNCTION
000010                  DRPAR=  BIT3            ;DRIVE DETECTED SERCON PARITY ERROR
000020                  FMTE=   BIT4            ;FORMAT ERROR
000040                  DTYE=   BIT5            ;DRIVE TYPE ERROR
000100                  ECH=    BIT6            ;ECC HARD
000200                  BSE=    BIT7            ;BAD SECTOR ERROR
000400                  HVRC=   BIT8            ;HEADER VRC ERROR
001000                  COE=    BIT9            ;CYL ADDRESS OVERFLOW ERROR
002000                  IDAE=   BIT10           ;INVALID DISK ADDRESS ERROR: HEAD/CYL
004000                  WLE=    BIT11           ;WRITE LOCK ERROR
010000                  DTE=    BIT12           ;DRIVE TIMING ERROR
020000                  OPI=    BIT13           ;OPERATION (SEARCH) INCOMPLETE
040000                  UNS=    BIT14           ;DRIVE UNSAFE
100000                  DCK=    BIT15           ;DATA CHECK

                        .SBTTL  STATUS REGISTER BIT DEFINITION (RKDS:12)

000001                  DRA=    BIT0            ;DRIVE AVAILABLE (CONTROLLER IS SET IF
                                                ;   THIS BIT IS RESET)
000004                  OFST=   BIT2            ;DRIVE OFFSET
000010                  ACLO=   BIT3            ;AC LOW
000020                  DCLO=   BIT4            ;DC LOW
000040                  DROT=   BIT5            ;DRIVE OFF TRACK
000100                  VV=     BIT6            ;VOLUME VALID
000200                  DRDY=   BIT7            ;DRIVE READY
000400                  DDT=    BIT8            ;DRIVE TYPE (0=RK06)
004000                  WRL=    BIT11           ;WRITE LOCK
020000                  PIP=    BIT13           ;POSITIONING IN PROGRESS
040000                  DSC=    BIT14           ;DRIVE STATUS CHANGE
100000                  SVAL=   BIT15           ;STATUS VALID

                        .SBTTL  MAINTENANCE REGISTER 1 BIT DEFINITION (RKMR1:22)

000017                  MESMSK= 17              ;MSG MASK
000020                  PAT=    BIT4            ;FORCE EVEN PARITY ON SERCON MSG LINES
000040                  DMD=    BIT5            ;DIAGNOSTIC MODE
000100                  MSP=    BIT6            ;MAINTENANCE SECTOR PULSE
000200                  MIND=   BIT7            ;MAINTENANCE INDEX
000400                  MCLK=   BIT8            ;MAINTENANCE CLOCK
001000                  MERD=   BIT9            ;MAINTENANCE ENCODED READ DATA
002000                  MEWD=   BIT10           ;MAINTENANCE ENCODED WRITE DATA
```

```
                004000          PCA=    BIT11                  ;PRECOMPENSATION ADVANCE
                010000          PCD=    BIT12                  ;PRECOMPENSATION DELAY
                020000          ECCW=   BIT13                  ;ECC WORD IS BEING READ OR WRITTEN
                040000          WRTGAT= BIT14                  ;WRITE GATE
                100000          RDGATE= BIT15                  ;READ GATE

                                .SBTTL  DEFINITION OF DRIVE STATUS BYTE 00 MSG A (RKMR2:34)

                000040          D.DRA=  BIT5                   ;DRIVE AVAILABLE
                000100          D.VV=   BIT6                   ;VOLUME VALID
                000200          D.DRDY= BIT7                   ;DRIVE READY
                000400          D.DDT=  BIT8                   ;DRIVE TYPE (0=RK06)
                001000          D.FORM= BIT9                   ;DRIVE FORMAT
                002000          D.OFF=  BIT10                  ;OFFSET ON
                004000          D.WRL=  BIT11                  ;WRITE LOCK
                010000          D.SPIN= BIT12                  ;SPINDLE ON
                020000          D.PIP=  BIT13                  ;POSITIONING IN PROGRESS
                040000          D.DSC=  BIT14                  ;DRIVE STATUS CHANGE

                                .SBTTL  DEFINITION OF DRIVE STATUS BYTE 01 MSG A (RKMR2:34)

                000020          D.SSP=  BIT4                   ;SERVO SIG PRESENT
                000040          D.HDHM= BIT5                   ;HEADS HOME
                000100          D.BRHM= BIT6                   ;BRUSHES HOME
                000200          D.DOOR= BIT7                   ;DOOR INTERLOCKED
                000400          D.CART= BIT8                   ;CARTRAGE INTERLOCK
                001000          D.SPOK= BIT9                   ;SPEED OK
                002000          D.FWD=  BIT10                  ;FORWARD
                004000          D.REV=  BIT11                  ;REVERSE
                010000          D.LOAD= BIT12                  ;HEADS LOADING
                020000          D.RTZ=  BIT13                  ;RETURN TO ZERO
                040000          D.UNLD= BIT14                  ;HEADS UNLOADING

                                .SBTTL  DEFINITION OF DRIVE STATUS BYTE 00 MSG B (RKMR3:36)

                000040          D.IDAE= BIT5                   ;INVALID DISK ADDRESS ERROR:HEAD CYL
                000100          D.ACLO= BIT6                   ;AC LOW
                000200          D.FLT=  BIT7                   ;DRIVE FAULT
                000400          D.ILF=  BIT8                   ;ILLEGAL FUNCTION CODE
                001000          D.PAR=  BIT9                   ;DRIVE DETECTED SERCON PARITY ERROR
                002000          D.SKI=  BIT10                  ;SEEK INCOMPLETE
                004000          D.WLE=  BIT11                  ;WRITE LOCK ERROR
                010000          D.SPLS= BIT12                  ;SPEED LOSS
                020000          D.DRCT= BIT13                  ;DRIVE OFF TRACK
                040000          D.UNS=  BIT14                  ;R/W UNSAFE

                                .SBTTL  DEFINITION OF DRIVE STATUS BYTE 01 MSG B (RKMR3:36)

                000020          D.SECT= BIT4                   ;SECTOR ERROR
                000040          D.WCUR= BIT5                   ;WRITE CURRENT AND NO WRITE GATE
                000100          D.WGAT= BIT6                   ;WRITE GATE AND NO TRANSISTIONS
                000200          D.HDFL= BIT7                   ;HEAD FAULT
                000400          D.MHD=  BIT8                   ;MULTIPLE HEAD SELECT
                001000          D.XERROR=       BIT9                    ;INDEX ERROR
                002000          D.TIB=  BIT10                  ;TRIBIT ERROR
                004000          D.PLO=  BIT11                  ;PLO ERROR
```

DEFINITION OF DRIVE STATUS BYTE 01 MSG B (RKMR3:36)

```
                        D.NMOV= BIT12                   ;SEEK AND NO MOTION
                        D.LIMD= BIT13                   ;LIMIT DETECT ON SEEK
                        D.SUNS= BIT14                   ;SERVO UNSAFE

                        .SBTTL  COMMON MASKS AND OTHER BITS: MSG A (RKMR2:34)

                        M.DRV=  7                       ;DRIVE CODE, ALL BYTES
                        M.CDIF= 17760                   ;CYL DIFF, BYTE 10
                        M.OFST= 17760                   ;OFFSET VALUE, BYTE 10
                        M.SER=  77770                   ;DRIVE SERIAL #, BYTE 11

                        .SBTTL  COMMON MASKS AND OTHER BITS: MSG B (RKMR3:36)

                        M.ID=   3                       ;BYTE ID, ALL BYTES
                        M.CADD= 17760                   ;CYL ADDRESS, BYTE 10
                        M.ALGN= BIT14                   ;ALIGN SIGN, BYTE 10
                        M.SECT= 760                     ;SECTOR COUNT, BYTE 11
                        M.HEAD= 7000                    ;HEAD DECODE, BYTE 11
                        M.PAR=  BIT15                   ;PARITY, MESS A/B, ALL BYTES
```

```
 1476
 1477                                   .SBTTL  TRAP CATCHER
 1478
 1479           000000                          .=0
 1480                                   ;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTRIN A ".+2,HALT"
 1481                                   ;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
 1482                                   ;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
 1483           000174                          .=174
 1484  000174  000000                  DISPREG: .WORD  0               ;;SOFTWARE DISPLAY REGISTER
 1485  000176  000000                  SWREG:   .WORD  0               ;;SOFTWARE SWITCH REGISTER
 1486                                   .SBTTL  STARTING ADDRESS(ES)
 1487  000200  000137  007132                  JMP     @#START ;;JUMP TO STARTING ADDRESS OF PROGRAM
 1488           000204                          .=204
 1489  000204  000137  007026                  JMP     BYT16           ;BYPASS N-SQUARE TEST IN DEFAULT MODE
 1490           000220                          .=220
 1491  000220  000137  007006                  JMP     PARSRT          ;INPUT ALL PARAMETERS & START TESTING
 1492           000230                          .=230
 1493  000230  000137  007046                  JMP     BYT16A  ;BYPASS N-SQUARE TEST IN PARAM MODE
 1494           000260                          .=260
 1495  000260  000137  007070                  JMP     MDTST           ;MODULE TESTS DEFAULT MODE ONLY
 1496           000270                                                  ;BYPASS SEVERAL TESTS
 1497  000270  000137  007110                  JMP     MDTSTA          ;SAME AS 260 & BYPASS N-SQUARE TEST ALSO
 1498
 1499                                   .SBTTL  ACT11 HOOKS
 1500
 1501                                   ;;*****************************************************************
 1502                                   ;HOOKS REQUIRED BY ACT11
 1503           000274                          $SVPC=.                 ;SAVE PC
 1504           000046                          .=46
 1505  000046  043604                          $ENDAD                  ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
 1506           000052                          .=52
 1507  000052  100000                          .WORD   100000          ;;2)SET LOC.52 TO 100000
 1508           000274                          .=$SVPC                 ;; RESTORE PC
 1509           001000                          .=1000
 1510                                   .SBTTL  APT PARAMETER BLOCK
 1511
 1512                                   ;;*****************************************************************
 1513                                   ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
 1514                                   ;;*****************************************************************
 1515           001000                          .$X=.   ;;SAVE CURRENT LOCATION
 1516           000024                          .=24    ;;SET POWER FAIL TO POINT TO START OF PROGRAM
 1517  000024  000200                          200     ;;FOR APT START UP
 1518           000044                          .=44    ;;POINT TO APT INDIRECT ADDRESS PNTR.
 1519  000044  001000                          $APTHDR ;;POINT TO APT HEADER BLOCK
 1520           001000                          .=.$X   ;;RESET LOCATION COUNTER
 1521                                   ;;*****************************************************************
 1522                                   ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
 1523                                   ;INTERFACE SPEC.
 1524
 1525  001000                           $APTHD:
 1526  001000  000000                  $HIBTS: .WORD   0       ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
 1527  001002  001210                  $MBADR: .WORD   $MAIL   ;;ADDRESS OF APT MAILBOX (BITS 0-15)
 1528  001004  000430                  $TSTM:  .WORD   280.    ;;RUN TIM OF LONGEST TEST
 1529  001006  001130                  $PASTM: .WORD   600.    ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
 1530  001010  001130                  $UNITM: .WORD   600.    ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
 1531  001012  000042                          .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
```

```
                        .LIST   MD
                ;
                ;USE LOOP X TO OMIT JSR PC, SUBCLR
                ;
                ;
                ;
                ; THIS MACRO FILLS EXPECTED MSG A0,B0,A1,B1,A2,B2 & B3 WITH STANDARD BITS SET
                ; A=D.DSC AFTER ATTN OR 0 AFTER DRIVE CLEAR OR ANY IMPLIED SEEKS
                ; NOTE: A CAN BE ANY BIT COMBINATION DESIRED
                ;
                ; THIS MACRO ASSUMES DRIVE MSG A0,B0,A1,B1 WILL ALWAYS BE TESTED
                ; USE   A,C,D,E FOR MSG A0,B0,A1,B1 ERROR NUMBERS RESP.
                ; USE   G=T.A2  TO READ MSG A2 & PUT INFO INTO 'CYLDIF'
                ;       H=T.B2  TO READ MSG B2 & PUT INFOR INTO 'CYLADD'
                ;       I=T.B3  TO READ MSG B3 & PUT INFO INTO 'SECTOR' & 'HEADA'
                ;
                ;       F=      < ERROR DESCRIPTION>
                ;
                ; A=CYL DIFF/OFFSET ERROR #
                ; B=CYL ADDR ERROR #
                ; C= <ERROR DESCRIPTION>
                ;
                ;
                ;
                ;SWR9 (LOOP ON ERROR) TEST      A=BRANCH POINT TO RECONDITION DRIVE
                ;                               B=JMP POINT TO RE-ENTER MAIN LINE
                ;
                ;
                ; USE DRCLR     X    TO OMIT CHECKING MSG A0,B0,A1 & B1
                ;
                ;
                ;A=BLANK TO CHECK A0 THRU B2
                ;A=NON BLANK TO OMIT CHECKING A0 THRU B2
                ;D=BLANK TO CHECK A0 THRU B2 IN DRCLR
                ;D=NON-BLANK TO OMIT CHECKING A0 THRU B2 IN DRCLR
                ;
                ;
                ;IDAE IS CLEARED ONLY BY RECAL & DRIVE CLEAR
                ;
                ;
                ; A=C.FWD/D.REV
                ;
```

```
1588
1589                            ;
1590                            ;QUICK START SPINDLE.
1591                            ;
1592
1593                            ;
1594                            ;QUICK SEEK.    ENTER WITH CYL # IN RKDC
1595                            ;
1596
1597                            ;
1598                            ;QUICK REPETITIVE SEEKS
1599                            ;       A=INC/DEC    CYL#
1600                            ;       B=FIND VALUE OF CYL# BEFORE EXITING
1601
1602
1603                            ;
1604                            ;QUICK UNLOAD
1605                            ;D=BLANK TO DO SUBCLR & LPCHK
1606                            ;D=NON-BLANK TO BYPASS
1607                            ;
1608
1609                            ;
1610                            ; A=WRHEAD/<CFMT!WRHEAD>
1611                            ; USE WRHDR     <A>,X   TO OMIT CHECKING A0,B0,A1,B1
1612                            ;
1613
1614                            ;
1615                            ; A=RDHEAD/<CFMT!RDHEAD>
1616                            ; USE RDHDR <A>,X TO OMIT CHECKING A0,B0,A1,B1
1617                            ;
1618
1619                            ;
1620                            ;A=TOCYL/FRCYL
1621                            ;B=310 FOR TOCYL/311 FOR FRCYL
1622                            ;
1623
1624
1625
1626
1627
1628                            ;
1629                            ; A=TOCYL/FRCYL , B=HEAD#, C = 0 FOR 22 SECTOR, 1 FOR 20 SECTOR
1630                            ;
1631
1632                            ;USE FSECA FS022,RDSEC,22 FOR 22 SECTOR FORMAT
1633                            ;USE FSECA FS020,R20SEC,20 FOR 20 SECTOR FORMAT.
1634                            ;
1635
1636                            ;USE FSECB FNS22,RDSEC,22 FOR 22 SECTOR FORMAT
1637                            ;USE FSECB FNS20,R20SEC,20 FOR 20 SECTOR FORMAT
1638                            ;
1639
1640                            ;
1641                            ;USE SECTST FS022,FNS22,RDSEC FOR 22 SECTOR FORMAT
1642                            ;USE SECTST FS020,FNS20,R20SEC FOR 20 SECTOR FORMAT
1643                            ;
```

```
1644
1645
1646
1647
1648
1649
1650
```

```
;
;DETECT OUTER LIMIT: 1,0,D,REV,OUTER
;DETECT INNER LIMIT: 409.,410.,D,FWD,INNER
;
```

```
1650
1651
1652                            ;
1653                            ; A=CYL#, B=HEAD#
1654                            ;
1655
1656
1657
1658                            ;
1659                            ;SEEK TO MAJOR CYL: 0,1,TEMP3,TEMP4,D.FWD,D.REV,ASL,400,DEC,0
1660                            ;SEEK 0 TO ALL CYL: 0,1,TEMP3,TEMP4,D.FWD,D.REV,INC,410.,DEC,0
1661                            ;SEEK 410 TO ALL CYL: 410.,409.,TEMP4,TEMP3,D.REV,D.FWD,DEC,0,INC,410.
1662                            ;
1663
1664
1665                                    .NLIST  MD
```

```
                                .SBTTL  COMMON TAGS

                                ;;**********************************************************************
                                ;*THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS
                                ;*USED IN THE PROGRAM.

                        001100          .=1100
001100                  $CMTAG:                         ;;START OF COMMON TAGS
001100  000000                  .WORD   0
001102  000                     $TSTNM: .BYTE   0       ;;CONTAINS THE TEST NUMBER
001103  000                     $ERFLG: .BYTE   0       ;;CONTAINS ERROR FLAG
001104  000000                  $ICNT:  .WORD   0       ;;CONTAINS SUBTEST ITERATION COUNT
001106  000000                  $LPADR: .WORD   0       ;;CONTAINS SCOPE LOOP ADDRESS
001110  000000                  $LPERR: .WORD   0       ;;CONTAINS SCOPE RETURN FOR ERRORS
001112  000000                  $ERTTL: .WORD   0       ;;CONTAINS TOTAL ERRORS DETECTED
001114  000                     $ITEMB: .BYTE   0       ;;CONTAINS ITEM CONTROL BYTE
001115  001                     $ERMAX: .BYTE   1       ;;CONTAINS MAX. ERRORS PER TEST
001116  000000                  $ERRPC: .WORD   0       ;;CONTAINS PC OF LAST ERROR INSTRUCTION
001120  000000                  $GDADR: .WORD   0       ;;CONTAINS ADDRESS OF 'GOOD' DATA
001122  000000                  $BDADR: .WORD   0       ;;CONTAINS ADDRESS OF 'BAD' DATA
001124  000000                  $GDDAT: .WORD   0       ;;CONTAINS 'GOOD' DATA
001126  000000                  $BDDAT: .WORD   0       ;;CONTAINS 'BAD' DATA
001130  000000                          .WORD   0       ;;RESERVED--NOT TO BE USED
001132  000000                          .WORD   0
001134  000                     $AUTOB: .BYTE   0       ;;AUTOMATIC MODE INDICATOR
001135  000                     $INTAG: .BYTE   0       ;;INTERRUPT MODE INDICATOR
001136  000000                          .WORD   0
001140  177570                  SWR:    .WORD   DSWR    ;;ADDRESS OF SWITCH REGISTER
001142  177570                  DISP_AY: .WORD  DDISP   ;;ADDRESS OF DISPLAY REGISTER
001144  177560                  $TKS:   177560          ;;TTY KBD STATUS
001146  177562                  $TKB:   177562          ;;TTY KBD BUFFER
001150  177564                  $TPS:   177564          ;;TTY PRINTER STATUS REG. ADDRESS
001152  177566                  $TPB:   177566          ;;TTY PRINTER BUFFER REG. ADDRESS
001154  000                     $NULL:  .BYTE   0       ;;CONTAINS NULL CHARACTER FOR FILLS
001155  002                     $FILLS: .BYTE   2       ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
001156  012                     $FILLC: .BYTE   12      ;;INSERT FILL CHARS. AFTER A "LINE FEED"
001157  000                     $TPFLG: .BYTE   0       ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
001160  000000                  $TMP0:  .WORD   0       ;;USER DEFINED
001162  000000                  $TMP1:  .WORD   0       ;;USER DEFINED
001164  000000                  $TMP2:  .WORD   0       ;;USER DEFINED
001166  000000                  $TMP3:  .WORD   0       ;;USER DEFINED
001170  000000                  $TMP4:  .WORD   0       ;;USER DEFINED
001172  000000                  $TMP5:  .WORD   0       ;;USER DEFINED
001174  000000                  $TIMES: 0               ;;MAX. NUMBER OF ITERATIONS
001176  000000                  $ESCAPE:0               ;;ESCAPE ON ERROR ADDRESS
001200  177607  000377          $BELL:  .ASCIZ  <207><377><377> ;;CODE FOR BELL
001204  077                     $QUES:  .ASCII  /?/     ;;QUESTION MARK
001205  015                     $CRLF:  .ASCII  <15>    ;;CARRIAGE RETURN
001206  000012                  $LF:    .ASCIZ  <12>    ;;LINE FEED
                                ;;**********************************************************************
                                .SBTTL  APT MAILBOX-ETABLE

                                ;;**********************************************************************
                                .EVEN
001210                          $MAIL:                  ;;APT MAILBOX
001210  000000                  $MSGTY: .WORD   AMSGTY  ;;MESSAGE TYPE CODE
```

```
1722  001212  000000          $FATAL: .WORD   AFATAL  ;;FATAL ERROR NUMBER
1723  001214  000000          $TESTN: .WORD   ATESTN  ;;TEST NUMBER
1724  001216  000000          $PASS:  .WORD   APASS   ;;PASS COUNT
1725  001220  000000          $DEVCT: .WORD   ADEVCT  ;;DEVICE COUNT
1726  001222  000000          $UNIT:  .WORD   AUNIT   ;;I/O UNIT NUMBER
1727  001224  000000          $MSGAD: .WORD   AMSGAD  ;;MESSAGE ADDRESS
1728  001226  000000          $MSGLG: .WORD   AMSGLG  ;;MESSAGE LENGTH
1729  001230                  $ETABLE:                ;;APT ENVIRONMENT TABLE
1730  001230     000          $ENV:   .BYTE   AENV    ;;ENVIRONMENT BYTE
1731  001231     000          $ENVM:  .BYTE   AENVM   ;;ENVIRONMENT MODE BITS
1732  001232  000000          $SWREG: .WORD   ASWREG  ;;APT SWITCH REGISTER
1733  001234  000000          $USWR:  .WORD   AUSWR   ;;USER SWITCHES
1734  001236  000000          $CPUOP: .WORD   ACPUOP  ;;CPU TYPE,OPTIONS
1735                          ;*                      BITS 15-11=CPU TYPE
1736                          ;*                              11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
1737                          ;*                              11/70=06,PDQ=07,Q=10
1738                          ;*                      BIT 10=REAL TIME CLOCK
1739                          ;*                      BIT  9=FLOATING POINT PROCESSOR
1740                          ;*                      BIT  8=MEMORY MANAGEMENT
1741  001240     000          $MAMS1: .BYTE   AMAMS1  ;;HIGH ADDRESS,M.S. BYTE
1742  001241     000          $MTYP1: .BYTE   AMTYP1  ;;MEM. TYPE,BLK#1
1743                          ;*                      MEM.TYPE BYTE   --  (HIGH BYTE)
1744                          ;*                              900 NSEC CORE=001
1745                          ;*                              300 NSEC BIPOLAR=002
1746                          ;*                              500 NSEC MOS=003
1747  001242  000000          $MADR1: .WORD   AMADR1  ;;HIGH ADDRESS,BLK#1
1748                          ;*                       MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF "TYPE" ABOVE
1749  001244     000          $MAMS2: .BYTE   AMAMS2  ;;HIGH ADDRESS,M.S. BYTE
1750  001245     000          $MTYP2: .BYTE   AMTYP2  ;;MEM.TYPE,BLK#2
1751  001246  000000          $MADR2: .WORD   AMADR2  ;;MEM.LAST ADDRESS,BLK#2
1752  001250     000          $MAMS3: .BYTE   AMAMS3  ;;HIGH ADDRESS,M.S.BYTE
1753  001251     000          $MTYP3: .BYTE   AMTYP3  ;;MEM.TYPE,BLK#3
1754  001252  000000          $MADR3: .WORD   AMADR3  ;;MEM.LAST ADDRESS,BLK#3
1755  001254     000          $MAMS4: .BYTE   AMAMS4  ;;HIGH ADDRESS,M.S.BYTE
1756  001255     000          $MTYP4: .BYTE   AMTYP4  ;;MEM.TYPE,BLK#4
1757  001256  000000          $MADR4: .WORD   AMADR4  ;;MEM.LAST ADDRESS,BLK#4
1758  001260  000000          $VECT1: .WORD   AVECT1  ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
1759  001262  000000          $VECT2: .WORD   AVECT2  ;;INTERRUPT VECTOR#2BUS PRIORITY#2
1760  001264  177440          $BASE:  .WORD   ABASE   ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
1761  001266  000000          $DEVM:  .WORD   ADEVM   ;;DEVICE MAP
1762  001270  000000          $CDW1:  .WORD   ACDW1   ;;CONTROLLER DESCRIPTION WORD#1
1763  001272  000000          $CDW2:  .WORD   ACDW2   ;;CONTROLLER DESCRIPTION WORD#2
1764  001274  000000          $DDW0:  .WORD   ADDW0   ;;DEVICE DESCRIPTOR WORD#0
1765  001276  000000          $DDW1:  .WORD   ADDW1   ;;DEVICE DESCRIPTOR WORD#1
1766  001300  000000          $DDW2:  .WORD   ADDW2   ;;DEVICE DESCRIPTOR WORD#2
1767  001302  000000          $DDW3:  .WORD   ADDW3   ;;DEVICE DESCRIPTOR WORD#3
1768  001304  000000          $DDW4:  .WORD   ADDW4   ;;DEVICE DESCRIPTOR WORD#4
1769  001306  000000          $DDW5:  .WORD   ADDW5   ;;DEVICE DESCRIPTOR WORD#5
1770  001310  000000          $DDW6:  .WORD   ADDW6   ;;DEVICE DESCRIPTOR WORD#6
1771  001312  000000          $DDW7:  .WORD   ADDW7   ;;DEVICE DESCRIPTOR WORD#7
1772  001314                  $ETEND:
1773                          .MEXIT
1774          177440          ABASE=  177440                  ;DEFAULT BUSS ADDRESS
1775  001314  000210          RKVEC:  210                     ;DEFAULT CONTROLLER INTERRORUPT VECTOR
1776  001316  000240          RKPRI:  PR5                     ;PRIORITY
1777  001320  172540          PKS:    172540                  ;P-CLOCK STATUS REG
```

```
1778  001322  172542          PKSB:   172542          ;P-CLOCK SET BUFFER
1779  001324  172544          PKRB:   172544          ;P-CLOCK READ BUFFER
1780  001326  177546          LKS:    177546          ;L-CLOCK STATUS REG.
1781
1782  001330  000100          LCVEC:  100             ;L-CLOCK INTERRORUPT VECTOR
1783  001332  000104          PCVEC:  104             ;P-CLOCK INTERRORUPT VECTOR.
1784
1785          000114          MEMVEC= 114             ;MEMORY PARITY VECTOR
1786          172100          MEMBAS= 172100          ;MEMORY PARITY OPTION CSR START ADDR
1787  001334  000000          TRAPPC: 0               ;PC FOR MEMORY CHECK ENABLE TRAP
1788
1789  001336  000000          PARAM:  0               ;1 FOR 220 OR 230 START, NO DEFAULT
1790  001340  000000          BYPT16: 0               ;1 FOR 210, 230, 270 START
1791  001342  000000          MODTST: 0               ;1 FOR 260 OR 270 START
1792  001344  000000          FTITLE: 0               ;FLAG FOR PRINTING OUT 1ST PROGRAM TITLE
1793
1794  001346  000000          DRVPTR: 0               ;CONTAINS THE POINTER TO THE DRIVE FLAG
1795                                                  ;(DRIV0-DRIV7) OF THE DRIVE TO BE CHECKED NEXT.
1796  001350  000000          FRCYL:  0               ;FROM CYL
1797  001352  000000          TOCYL:  0               ;TO CYL
1798  001354  000000          CCYL:   0               ;CURRENT CYL, USED IN N SQUARE TEST
1799  001356  000000          PCYL:   0               ;PREV CYL., USED IN N SQUARE TEST
1800  001360  000000          CALDIF: 0               ;CALC CYL DIFF USED IN N SQUARE TEST
1801  001362  000000          CYLDIF: 0               ;CYL DIFF, RIGHT JUSTIFIED FROM RKMR3
1802  001364  000000          CYLADD: 0               ;CYL ADDR, RIGHT JUSTIFIED FROM RKMR3
1803  001366  000000          CALADD: 0               ;CYL ADDR USED IN FHDTAB ROUTINE
1804
1805  001370  000074          HZ:     60.             ;60 FOR 60 CPS
1806                                                  ;50 FOR 50 CPS
1807  001372  000000          COUNT:  0               ;LOADED TO 50 OR 60 TO COUNT TO 1 SEC
1808                                                  ;OR ANY OTHER NUMBER TO COUNT OFF FRACTIONAL SECOND
1809  001374  000000          SEC:    0               ;SECOND COUNTER
1810  001376  000000          TIMUP:  0               ;FLAG TO INDICATE TIME IS UP
1811  001400  000000          SECNT:  0               ;SECTOR COUNT
1812  001402  000000          PSEC:   0               ;PREVIOUS SECTOR
1813  001404  000000          ESEC:   0               ;EXPECTED SECTOR
1814  001406  000000          SECTOR: 0               ;SECTOR COUNT, RIGHT JUSTIFIED FROM RKMR3
1815
1816  001410  000000          LPFLG:  0               ;SET TO 0 TO RETURN TO $LPADR
1817                                                  ;IF SW14 OR SW8 SET
1818                                                  ;SET TO 1 TO RETURN TO $LPERR
1819                                                  ;IF SW9 SET
1820  001412  000001          T1:     1               ;TIMEOUT CONSTANTS
1821  001414  000012          T10:    10.
1822  001416  000144          T100:   100.
1823  001420  000764          T500:   500.
1824  001422  004704          T2500:  2500.
1825  001424  011610          T5000:  5000.
1826  001426  141520          T50000: 50000.
1827
1828  001430  000000          HEAD:   0               ;HEAD NUMBER
1829  001432  000000          HEADA:  0               ;HEAD # FROM H.B3 RIGHT JUSTIFIED
1830  001434  000000          HD1:    0               ;SHIFTED HEAD# FOR FORMATTER ROUTINE
1831  001436  000000          FORMAT: 0               ;FORMAT TYPE
1832  001440  000000          FMT1:   0               ;SHIFTED FORMAT FOR FORMATTER ROUTINE
1833  001442  000000          WDCNT:  0               ;WORD COUNT
```

```
1834
1835  001444  000000                DATA0:  0                       ;ALL 0'S
1836  001446  052525                DATA01: 52525                   ;0101 PATT
1837  001450  177777                DATA1:  177777                  ;ALL 1'S
1838
1839  001452  000000                WORD:   0                       ;HEADER/DATA WORD
1840  001454  000000                HDWD:   0                       ;HEADER WORD FROM RK08
1841
1842  001456  000000                BSERR:  0                       ;CANNOT READ BSE INFO WHEN SET
1843  001460  000000                LIMERROR:       0                       ;LIMIT DETECT ERROR FLAG
1844
1845  001462  000000                BYPCERR:0                       ;SET TO 1 TO BYPASS CKCERR IN GSTAT1 ROUTINE
1846  001464  000000                BYPFMT: 0                       ;BYPASS FORMAL FORMATTING OF HEADERS
1847                                                                ;UNTIL BSE INFO HAS BEEN STORED.
1848                                                                ;IF SET, BIT 14,15 = 1
1849
1850  001466  000000                CHKFLG: 0                       ;WORDS TO BE CHECKED
1851
1852  001470  000102                HDTAB:  .BLKW 66.               ;CALCULATED HEADER WORD TABLE
1853  001674  000102                RHTAB:  .BLKW 66.               ;FILLED AFTER READ HEADER CMD
1854  002100  000102                SRTTAB: .BLKW 66.               ;ABOVE RHTAB SORTED STARTING FORM
1855                                                                ;SECTOR 0 BY SORT ROUTINE
1856  002304  000400                BSE22H: .BLKW 256.              ;22 SECTOR HARDWARE BSE INFO.
1857                                                                ;22 SECTOR SOFTWARE BSE INFO
1858                                                                ;OVERLAYS MSG1
1859
1860  003304  000633                INVCYL: 411.                    ;INVALID CYL ADDR
1861  003306  000634                        412.
1862  003310  000640                        416.
1863  003312  000700                        448.
1864  003314  000740                        480.
1865
1866  003316  000000                UNLD:   0                       ;SET TO 0 IF HEADS ARE LOADED
1867                                                                ;SET TO 1 IF HEADS UNLOADED
1868  003320  000000                BADHDR: 0                       ;SET TO 0 IF FORMATTING OK
1869                                                                ;SET TO 1 IF FORMATTING ALTERED
1870  003322  000000                HPEND:  0                       ;SET TO 0 IF HALT NOT PENDING
1871                                                                ;SET TO 1 IF HALT PENDING
1872
1873                                                                ;THE ABOVE 3 FLAGS ARE USED
1874                                                                ;BY 'STOP' ROUTINE TO BRING
1875                                                                ;THE CPU TO A VALID HALT.
1876
1877  003324    001     002     004 ATTN:   .BYTE 1,2,4,10,20,40,100,200    ;ATN 0-7 RESP.
1878  003327    010     020     040
1879  003332    100     200
1880                                .EVEN
1881
1882
1883                                ;
1884                                ;THE FOLLOWING ARE HOLDING REGISTERS FOR THE RK611 REGISTERS
1885                                ;THEY ARE LOADED AFTER RDY IS REC'D FROM WRDY ROUTINE.
1886                                ;
1887
1888  003334  000000                HCS1:   0                       ;HOLD RKCS1
1889  003336  000000                HCS2:   0                       ;HOLD RKCS2
```

```
1890  003340  000000          HWC:    0                       ;HOLD RKWC
1891  003342  000000          HBA:    0                       ;ETC.
1892  003344  000000          HDA:    0
1893  003346  000000          HDS:    0
1894  003350  000000          HER:    0
1895  003352  000000          HASOF:  0
1896  003354  000000          HDC:    0
1897  003356  000000          HDB:    0
1898  003360  000000          HMR1:   0
1899  003362  000000          HMR2:   0
1900  003364  000000          HMR3:   0
1901  003366  000000          HPOS:   0
1902  003370  000000          HPAT:   0
1903
1904  003372  000000          TEMP1:  0                       ;TEMPORARY STORAGE.
1905  003374  000000          TEMP2:  0
1906  003376  000000          TEMP3:  0
1907  003400  000000          TEMP4:  0
1908  003402  000000          TEMP5:  0
1909                          ;
1910                          ; THE FOLLOWING ARE HOLDING REGISTERS FOR MSG A (0-3) & MSG B (0-3)
1911                          ;
1912  003404  000000          H.A0:   0
1913  003406  000000          H.B0:   0
1914  003410  000000          H.A1:   0
1915  003412  000000          H.B1:   0
1916  003414  000000          H.A2:   0
1917  003416  000000          H.B2:   0
1918  003420  000000          H.A3:   0
1919  003422  000000          H.B3:   0
1920                          ;
1921                          ; THE FOLLOWING ARE 'EXPECTED' REGISTER FOR THE ABOVE
1922                          ;
1923  003424  000000          E.A0:   0
1924  003426  000000          E.B0:   0
1925  003430  000000          E.A1:   0
1926  003432  000000          E.B1:   0
1927  003434  000000          E.A2:   0
1928  003436  000000          E.B2:   0
1929  003440  000000          E.A3:   0
1930  003442  000000          E.B3:   0
1931
1932                          ;
1933                          ; THE FOLLOWING ARE IDENTITIES FOR DRIVE MSG WORDS TO BE TESTED
1934                          ;
1935          000001          T.A2=BIT0                       ;TEST MSG A2 IF SET
1936          000002          T.B2=BIT1
1937          000004          T.B3=BIT2
1938
1939                          ;
1940                          ;ALL THE FLAGS BELOW ARE CLEARED INITIALLY BY THE CLRFLG ROUTINE.
1941                          ;
1942
1943  003444  000000          DDUMP:  0                       ;FLAG - SET WHEN IN DDP DUMP MODE
1944  003446  000000          DDPCH:  0                       ;FLAG - SET WHEN IN DDP CHAIN MODE
1945  003450  000000          ACT11:  0                       ;FLAG - SET WHEN IN ACT11 MODE OF OPERATION
```

```
  1946  003452  000000  PPTP:   0                       ;FLAG - SET WHEN PROGRAM LOADED BY PAPER TAPE
  1947  003454  000000  DRIVS:  0                       ;CONTAINS THE NUMBER OF DRIVES PRESENT
  1948
  1949                  ;THE FLAGS BELOW ARE SET TO 1 TO INDICATE THAT A PARTICULAR DRIVE
  1950                  ;IS PRESENT AND IS TO BE TESTED.
  1951
  1952  003456  000000  DRIV0:  0                       ;FLAG SET TO 1 WHEN DRIVE 0 PRESENT
  1953  003460  000000  DRIV1:  0                       ;FOR DRIVE 1
  1954  003462  000000  DRIV2:  0                       ;FOR DRIVE 2
  1955  003464  000000  DRIV3:  0                       ;FOR DRIVE 3
  1956  003466  000000  DRIV4:  0                       ;FOR DRIVE 4
  1957  003470  000000  DRIV5:  0                       ;FOR DRIVE 5
  1958  003472  000000  DRIV6:  0                       ;FOR DRIVE 6
  1959  003474  000000  DRIV7:  0                       ;FOR DRIVE 7
  1960
  1961  003476  000000  LCLKF:  0                       ;L-CLOCK FLAG PRESENT FLAG
  1962  003500  000000  PCLKF:  0                       ;P-CLOCK FLAG PRESENT FLAG
  1963  003502  000000  DOTIM:  0                       ;SET IF EITHER CLOCK PRESENT FOR TIMING TESTS.
  1964  003504  000000  SIZFLG: 0                       ;SET IF DEFAULT DO SIZING IN TEST 1
```

```
                        .SBTTL  ERROR POINTER TABLE

                        ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
                        ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
                        ;*LOCATION $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
                        ;*NOTE1:        IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
                        ;*NOTE2:        EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:

                        ;*      EM              ;;POINTS TO THE ERROR MESSAGE
                        ;*      DH              ;;POINTS TO THE DATA HEADER
                        ;*      DT              ;;POINTS TO THE DATA
                        ;*      DF              ;;POINTS TO THE DATA FORMAT


003536                  $ERRTB:

                        ;ERROR 1
003536  057327                  EM2                     ;DR # IN RKCS2 CANNOT BE READ BACK CORRECTLY IN RKMR2
003540  064066                  DH1
003542  066636                  DT1
003544  067240                  DF1

                        ;ERROR 2
003546  057464                  EM5                     ;DETECTED MDS
003550  064066                  DH1
003552  066636                  DT1
003554  067240                  DF1

                        ;ERROR 3
003556  057505                  EM6                     ;DETECTED UFE
003560  064066                  DH1
003562  066636                  DT1
003564  067240                  DF1

                        ;ERROR 4
003566  057526                  EM7                     ;DETECTED DRA & NED RESET (WRONG PORT SELECTED?)
003570  064066                  DH1
003572  066636                  DT1
003574  067240                  DF1

                        ;ERROR 5
003576  057615                  EM8                     ;DR PRESENT BUT NOT SPECIFIED BY OPERATOR
003600  064066                  DH1
003602  066636                  DT1
003604  067240                  DF1

                        ;ERROR 6
003606  057665                  EM9                     ;DR NOT PRESENT BUT SPECIFIED BY OPERATOR
003610  064066                  DH1
003612  066636                  DT1
003614  067240                  DF1

                        ;ERROR 7
003616  057735                  EM10                    ;ABORT TEST, COULD NOT REFERENCE CONTROLLER REGISTER
003620  064066                  DH1
003622  066636                  DT1
003624  067240                  DF1
```

```
                        ;ERROR 10
003576  060000              EM11            ;DRA & NED BOTH SET
003600  064066              DH1
003602  066636              DT1
003604  067240              DF1

                        ;ERROR 11
003606  060044              EM12            ;CONTROLLER NOT READY
003610  064754              DH18            ;AFTER UNLOAD CMD.
003612  066606              DT1
003614  067334              DF10

                        ;ERROR 12
003616  060075              EM13            ;NO ATTN
003620  064754              DH18            ;AFTER UNLOAD CMD
003622  066606              DT1
003624  067334              DF10
                        ;ERROR 13
003626  060117              EM14            ;WRONG ATTN
003630  064754              DH18
003632  066606              DT1
003634  067334              DF10
                        ;ERROR 14
003636  060144              EM15            ;DRDY NOT CLEARED
003640  064754              DH18
003642  066606              DT1
003644  067334              DF10
                        ;ERROR 15
003646  060176              EM16            ;DSC NOT SET
003650  064754              DH18
003652  066606              DT1
003654  067334              DF10
                        ;ERROR 16
003656  060223              EM17            ;MSG A0 ERROR
003660  064354              DH8             ;IN UNLD
003662  067054              DT13
003664  067454              DF20
                        ;ERROR 17
003666  060236              EM18            ;MSG B0 ERROR
003670  064354              DH8             ;IN UNLD
003672  067054              DT13
003674  067454              DF20
                        ;ERROR 20
003676  060251              EM19            ;MSG A1 ERROR
003700  064354              DH8             ;IN UNLD
003702  067054              DT13
003704  067454              DF20
                        ;ERROR 21
003706  060264              EM20            ;MSG B1 ERROR
003710  064354              DH8             ;IN UNLD
003712  067054              DT13
003714  067454              DF20
                        ;ERROR 22
003716  061614              EM46            ;MSG A2 ERROR
003720  064354              DH8             ;IN UNLD
```

ERROR POINTER TABLE

```
2077  003722  067114                DT14
2078  003724  067520                DF22
2079                          ;ERROR 23
2080  003726  061627                EM47          ;MSG B2 ERROR
2081  003730  064354                DH8           ;IN UNLD
2082  003732  067114                DT14
2083  003734  067520                DF22
2084
2085                          ;ERROR 24
2086  003736  060277                EM21          ;CERR SET
2087  003740  065043                DH21          ;AFTER SCLR
2088  003742  066606                DT1
2089  003744  067334                DF10
2090                          ;ERROR 25
2091  003746  060321                EM22          ;RLS DID NOT SET CERR
2092  003750  064066                DH1
2093  003752  066606                DT1
2094  003754  067240                DF1
2095
2096                          ;ERROR 26
2097  003756  060360                EM23          ;SACK SET AFTER RLS SENT
2098  003760  064066                DH1
2099  003762  066606                DT1
2100  003764  067240                DF1
2101
2102                          ;ERROR 27
2103  003766  060440                EM24          ;VOL VALID NOT SET
2104  003770  064775                DH19          ;AFTER PACK CMD
2105  003772  066606                DT1
2106  003774  067334                DF10
2107                          ;ERROR 30
2108  003776  060464                EM25          ;DRIVE TYPE SET IN MR2
2109  004000  064066                DH1
2110  004002  066606                DT1
2111  004004  067240                DF1
2112                          ;ERROR 31
2113  004006  060512                EM26          ;DDT SET IN RKDS
2114  004010  064066                DH1
2115  004012  066606                DT1
2116  004014  067240                DF1
2117                          ;ERROR  32
2118  004016  060532                EM27          ;DTYE SET IN RKER
2119  004020  064066                DH1
2120  004022  066606                DT1
2121  004024  067240                DF1
2122                          ;ERROR 33
2123  004026  060553                EM28          ;DTYE NOT SET IN RKER
2124  004030  064066                DH1
2125  004032  066606                DT1
2126  004034  067240                DF1
2127                          ;ERROR 34
2128  004036  060600                EM29          ;DTYE DID NOT SET CERR
2129  004040  064066                DH1
2130  004042  066606                DT1
2131  004044  067240                DF1
2132                          ;ERROR 35
```

ERROR POINTER TABLE

```
2133  004046  060647          EM30                    ;C-D PARITY ERROR SET IN MR3
2134  004050  064066          DH1
2135  004052  066606          DT1
2136  004054  067240          DF1
2137                    ;ERROR 36
2138  004056  060700          EM31                    ;D-C PARITY  SET IN CS1
2139  004060  064066          DH1
2140  004062  066606          DT1
2141  004064  067240          DF1
2142                    ;ERROR 37
2143  004066  060725          EM32                    ;FAULT NOT SET IN MR3
2144  004070  064066          DH1
2145  004072  066606          DT1
2146  004074  067240          DF1
2147                    ;ERROR 40
2148  004076  060752          EM33                    ;C-D PARITY ERROR NOT SET IN MR3
2149  004100  064066          DH1
2150  004102  066606          DT1
2151  004104  067240          DF1
2152                    ;ERROR 41
2153  004106  061007          EM34                    ;D-C PARITY  NOT SET IN CS1
2154  004110  064066          DH1
2155  004112  066606          DT1
2156  004114  067240          DF1
2157                    ;ERROR 42
2158  004116  061040          EM35                    ;DCPAR DID NOT SET CERR
2159  004120  064066          DH1
2160  004122  066606          DT1
2161  004124  067240          DF1
2162                    ;ERROR 43
2163  004126  061113          EM36                    ;CYL ADDR IN B2 NOT = RKDC
2164  004130  064642          DH14                    ;AFTER SEEK WITH BAD PARITY
2165  004132  067114          DT14
2166  004134  067520          DF22
2167                    ;ERROR 44
2168  004136  061153          EM37                    ;CYL DIFF IN A2 NOT=RKDC
2169  004140  064642          DH14
2170  004142  067114          DT14
2171  004144  067520          DF22
2172                    ;ERROR 45
2173  004146  061113          EM36                    ;CYL ADDR IN RKMR3 NOT=RKDC
2174  004150  064642          DH14
2175  004152  066652          DT4
2176  004154  067320          DF6
2177                    ;ERROR 46
2178  004156  061213          EM38                    ;CYL DIFF IN RKMR2 NOT=CALDIF
2179  004160  064642          DH14
2180  004162  066652          DT4
2181  004164  067320          DF6
2182                    ;ERROR 47
2183  004166  061264          EM39                    ;CYL DIFF/OFFSET IN RKMR2 NOT CLEARED
2184  004170  064734          DH17                    ;AFTER RECAL CMD
2185  004172  067114          DT14
2186  004174  067520          DF22
2187                    ;ERROR 50
2188  004176  061321          EM40                    ;CYL ADDR IN RKMR3 NOT CLEARED
```

ERROR POINTER TABLE

```
2189  004200  064734          DH17                    ;AFTER RECAL COMD
2190  004202  067114          DT14
2191  004204  067520          DF22
2192                    ;ERROR 51
2193  004206  060223          EM17                    ;A0 ERROR
2194  004210  065157          DH26                    ;AFTER READ DATA CMD
2195  004212  067054          DT13
2196  004214  067454          DF20
2197                    ;ERROR 52
2198  004216  060236          EM18                    ;B0 ERROR
2199  004220  065157          DH26
2200  004222  067054          DT13
2201  004224  067454          DF20
2202                    ;ERROR 53
2203  004226  061410          EM43                    ;HEAD DECODE IN B3 NOT CLEARED
2204  004230  064734          DH17                    ;AFTER RECAL CMD
2205  004232  067164          DT15
2206  004234  067554          DF23
2207                    ;ERROR 54
2208  004236  061437          EM44                    ;B3 HEAD DECODE INCORRECT
2209  004240  064672          DH16
2210  004242  067164          DT15
2211  004244  067554          DF23
2212                    ;ERROR 55
2213  004246  060075          EM13                    ;NO ATTN
2214  004250  064734          DH17                    ;AFTER RECAL CMD
2215  004252  066606          DT1
2216  004254  067334          DF10
2217                    ;ERROR 56
2218  004256  062561          EM64                    ;MSG B3 HEAD REG NOT CLEARED
2219  004260  064354          DH8                     ;IN UNLOAD
2220  004262  067164          DT15
2221  004264  067554          DF23
2222                    ;ERROR 57
2223  004266  060223          EM17                    ;MSG A0 ERROR
2224  004270  064400          DH9                     ;AFTER START SPINDLE CMD REC'D BY DRIVE
2225  004272  067054          DT13
2226  004274  067454          DF20
2227                    ;ERROR 60
2228  004276  060236          EM18                    ;MSG B0 ERROR
2229  004300  064400          DH9
2230  004302  067054          DT13
2231  004304  067454          DF20
2232                    ;ERROR 61
2233  004306  060251          EM19                    ;MSG A1 ERROR
2234  004310  064400          DH9
2235  004312  067054          DT13
2236  004314  067454          DF20
2237                    ;ERROR 62
2238  004316  060264          EM20                    ;MSG B1 ERROR
2239  004320  064400          DH9
2240  004322  067054          DT13
2241  004324  067454          DF20
2242                    ;ERROR 63
2243  004326  060223          EM17
2244  004330  064444          DH10                    ;AT END OF HEAD LOADING
```

```
2245  004332  067054                    DT13
2246  004334  067454                    DF20
2247                            ;ERROR 64
2248  004336  060236                    EM18
2249  004340  064444                    DH10
2250  004342  067054                    DT13
2251  004344  067454                    DF20
2252                            ;ERROR 65
2253  004346  060251                    EM19
2254  004350  064444                    DH10
2255  004352  067054                    DT13
2256  004354  067454                    DF20
2257                            ;ERROR 66
2258  004356  060264                    EM20
2259  004360  064444                    DH10
2260  004362  067054                    DT13
2261  004364  067454                    DF20
2262                            ;ERROR 67
2263  004366  060075                    EM13                    ;NO ATTN
2264  004370  064444                    DH10                    ;AT END OF HEAD LOADING.
2265  004372  066606                    DT1
2266  004374  067334                    DF10
2267                            ;ERROR 70
2268  004376  061743                    EM50                    ;FWD NOT SET WITHIN 60 SEC FROM
2269  004400  064066                    DH1                     ;START SPINDLE CMD.
2270  004402  066606                    DT1
2271  004404  067240                    DF1
2272                            ;ERROR 71
2273  004406  060223                    EM17
2274  004410  064473                    DH11                    ;AFTER START SPINDLE CMD & FWD SET.
2275  004412  067054                    DT13
2276  004414  067454                    DF20
2277                            ;ERROR 72
2278  004416  060236                    EM18
2279  004420  064473                    DH11
2280  004422  067054                    DT13
2281  004424  067454                    DF20
2282                            ;ERROR 73
2283  004426  060251                    EM19
2284  004430  064473                    DH11
2285  004432  067054                    DT13
2286  004434  067454                    DF20
2287                            ;ERROR 74
2288  004436  060264                    EM20
2289  004440  064473                    DH11
2290  004442  067054                    DT13
2291  004444  067454                    DF20
2292                            ;ERROR 75
2293  004446  062014                    EM51                    ;FWD NOT CLEARED WITHIN 5 SEC OF MOTION
2294  004450  064066                    DH1                     ;FROM START SPINDLE CMD.
2295  004452  066606                    DT1
2296  004454  067240                    DF1
2297                            ;ERROR 76
2298  004456  060223                    EM17
2299  004460  064532                    DH12                    ;AT INNER LIMIT FROM START SPINDLE CMD.
2300  004462  067054                    DT13
```

```
2301  004464  067454                    DF20
2302                            ;ERROR 77
2303  004466  060236                    EM18
2304  004470  064532                    DH12
2305  004472  067054                    DT13
2306  004474  067454                    DF20
2307                            ;ERROR 100
2308  004476  060251                    EM19
2309  004500  064532                    DH12
2310  004502  067054                    DT13
2311  004504  067454                    DF20
2312                            ;ERROR 101
2313  004506  060264                    EM20
2314  004510  064532                    DH12
2315  004512  067054                    DT13
2316  004514  067454                    DF20
2317                            ;ERROR 102
2318  004516  061655                    EM49                ;FWD NOT SET WITHIN 4 SEC IN RTZ PORTION
2319  004520  064066                    DH1                 ;OF START SPIN CMD.
2320  004522  066606                    DT1
2321  004524  067240                    DF1
2322                            ;ERROR 103
2323  004526  060223                    EM17
2324  004530  064573                    DH13                ;FROM OUTER LIMIT TO CYL 0 DURING LOADING
2325  004532  067054                    DT13
2326  004534  067454                    DF20
2327                            ;ERROR 104
2328  004536  060236                    EM18
2329  004540  064573                    DH13
2330  004542  067054                    DT13
2331  004544  067454                    DF20
2332                            ;ERROR 105
2333  004546  060251                    EM19
2334  004550  064573                    DH13
2335  004552  067054                    DT13
2336  004554  067454                    DF20
2337                            ;ERROR 106
2338  004556  060264                    EM20
2339  004560  064573                    DH13
2340  004562  067054                    DT13
2341  004564  067454                    DF20
2342                            ;ERROR 107
2343  004566  061473                    EM45                ;DRIVE READY NOT SET WITHIN 1 SEC
2344  004570  064066                    DH1                 ;FROM FWD IN RTZ PORTION OF START SPIN CMD.
2345  004572  066606                    DT1
2346  004574  067240                    DF1
2347                            ;ERROR 110
2348  004576  060223                    EM17                ;MSG A0 ERROR
2349  004600  064642                    DH14                ;AFTER SEEK WITH BAD PARITY
2350  004602  067114                    DT14
2351  004604  067520                    DF22
2352                            ;ERROR 111
2353  004606  060236                    EM18                ;MSG B0 ERROR
2354  004610  064642                    DH14                ;AFTER SEEK WITH BAD PARITY
2355  004612  067114                    DT14
2356  004614  067520                    DF22
```

```
2357
2358  004616  060251          ;ERROR 112
2359  004620  065157                EM19                    ;A1 ERROR
2360  004622  067054                DH26                    ;AFTER READ DATA CMD
2361  004624  067454                DT13
2362                           DF20
2363  004626  060264          ;ERROR 113
2364  004630  065157                EM20                    ;B1 ERROR
2365  004632  067054                DH26
2366  004634  067454                DT13
2367                           DF20
2368  004636  060223          ;ERROR 114
2369  004640  064672                EM17
2370  004642  067054                DH16                    ;AFTER LOADING HEAD REGISTER & SEEK CMD
2371  004644  067454                DT13
2372                           DF20
2373  004646  060236          ;ERROR 115
2374  004650  064672                EM18
2375  004652  067054                DH16
2376  004654  067454                DT13
2377                           DF20
2378  004656  063044          ;ERROR 116
2379  004660  064775                EM12                    ;CONT NOT RDY
2380  004662  066606                DH19                    ;AFTER PACK CMD
2381  004664  067334                DT1
2382                           DF10
2383  004666  060044          ;ERROR 117
2384  004670  065014                EM12                    ;CONT NOT RDY
2385  004672  066606                DH20                    ;AFTER SEL DR CMD
2386  004674  067334                DT1
2387                           DF10
2388  004676  060044          ;ERROR 120
2389  004700  065043                EM12
2390  004702  066606                DH21                    ;AFTER SUBSYS CLEAR
2391  004704  067334                DT1
2392                           DF10
2393  004706  060044          ;ERROR 121
2394  004710  064400                EM12
2395  004712  066606                DH9                     ;AFTER START SPINDLE CMD
2396  004714  067334                DT1
2397                           DF10
2398  004716  060044          ;ERROR 122
2399  004720  064642                EM12
2400  004722  066606                DH14                    ;AFTER SEEk WITH BAD PARITY
2401  004724  067334                DT1
2402                           DF10
2403  004726  063672          ;ERROR 123
2404  004730  064066                EM88                    ;NO DRIVES FOUND
2405  004732  066606                DH1
2406  004734  067240                DT1
2407                           DF1
2408  004736  060044          ;ERROR 124
2409  004740  064734                EM12
2410  004742  066606                DH17                    ;AFTER RECAL CMD
2411  004744  067334                DT1
2412                           DF10
                               ;ERROR 125
```

```
2413  004746  060075                  EM13                    ;NO ATTN
2414  004750  064642                  DH14                    ;FROM SEEK WITH BAD PARITY
2415  004752  066606                  DT1
2416  004754  067334                  DF10
2417                          ;ERROR 126
2418  004756  063763                  EM89                    ;NO DRVS FOUND IN DEVICE MAP
2419  004760  064066                  DH1
2420  004762  066606                  DT1
2421  004764  067240                  DF1
2422                          ;ERROR 127
2423  004766  061264                  EM39                    ;CYL DIFF/OFFSET IN RKMR2 NOT CLEARED
2424  004770  065043                  DH21                    ;AFTER SCLR
2425  004772  066606                  DT1
2426  004774  067334                  DF10
2427                          ;ERROR 130
2428  004776  061321                  EM40                    ;CYL ADDR IN RKMR3 NOT CLEARED
2429  005000  065043                  DH21
2430  005002  066606                  DT1
2431  005004  067334                  DF10
2432                          ;ERROR 131
2433  005006  060044                  EM12                    ;NO RDY
2434  005010  065140                  DH25                    ;AFTER SEEK CMD
2435  005012  066606                  DT1
2436  005014  067334                  DF10
2437                          ;ERROR 132
2438  005016  060075                  EM13                    ;NO ATTN
2439  005020  065140                  DH25
2440  005022  066606                  DT1
2441  005024  067334                  DF10
2442                          ;ERROR 133
2443  005026  060223                  EM17                    ;MSG A0 ERROR
2444  005030  065140                  DH25
2445  005032  067054                  DT13
2446  005034  067454                  DF20
2447                          ;ERROR 134
2448  005036  060236                  EM18                    ;MSG B0 ERROR
2449  005040  065140                  DH25
2450  005042  067054                  DT13
2451  005044  067454                  DF20
2452                          ;ERROR 135
2453  005046  060251                  EM19                    ;MSG A1 ERROR
2454  005050  065140                  DH25
2455  005052  067054                  DT13
2456  005054  067454                  DF20
2457                          ;ERROR 136
2458  005056  060264                  EM20                    ;MSG B1 ERROR.
2459  005060  065140                  DH25
2460  005062  067054                  DT13
2461  005064  067454                  DF20
2462                          ;ERROR 137
2463  005066  061264                  EM39                    ;CYL DIFF/OFFSET IN A2 NOT CLEARED
2464  005070  065140                  DH25
2465  005072  067114                  DT14
2466  005074  067520                  DF22
2467                          ;ERROR 140
2468  005076  061321                  EM40                    ;CYL ADDR IN B2 NOT CLEARED
```

```
2469  005100  065140                ERROR POINTER TABLE
2470  005102  067114                        DH25
2471  005104  067520                        DT14
2472                                        DF22
2473  005106  062114          :ERROR 141
2474  005110  064066                EM52                    ;2D SECTOR FORMAT NOT SET IN RKMR2
2475  005112  066606                DH1
2476  005114  067240                DT1
2477                                DF1
2478  005116  062153          :ERROR 142
2479  005120  064066                EM53                    ;SECTOR 0 NOT FOUND WITHIN 50 MS
2480  005122  066606                DH1
2481  005124  067240                DT1
2482                                DF1
2483  005126  062204          :ERROR 143
2484  005130  064[illegible]        EM54                    ;DIFF SECTOR NOT FOUND WITHIN 3MS
2485  005132  066[illegible]        DH1
2486  005134  067[illegible]        DT1
2487                                DF1
2488  005136  06164[illegible] :ERROR 144
2489  005140  065532                EM48                    ;MSG B3 ERROR
2490  005142  066606                DH34                    ;SECTOR REG UNSTABLE
2491  005144  067334                DT1
                                    DF10
```

```
2492
2493  005146  061642          ;ERROR 145
2494  005150  065526                  EM48
2495  005152  066714                  DH35                    ;BETWEEN SECTOR COUNTS
2496  005154  067350                  DT6
2497                                   DF12
2498  005156  060251          ;ERROR 146
2499  005160  064642                  EM19                    ;MSG A1 ERROR
2500  005162  067114                  DH14                    ;AFTER SEEK WITH BAD PARITY
2501  005164  067520                  DT14
2502                                   DF22
2503  005166  060264          ;ERROR 147
2504  005170  064642                  EM20                    ;MSG B1 ERROR
2505  005172  067114                  DH14
2506  005174  067520                  DT14
2507                                   DF22
2508  005176  060251          ;ERROR 150
2509  005200  065636                  EM19                    ;MSG A1 ERROR
2510  005202  066606                  DH37
2511  005204  067334                  DT1
2512                                   DF10
2513  005206  060044          ;ERROR 151
2514  005210  065071                  EM12                    ;NO RDY
2515  005212  066606                  DH22                    ;AFTER CLEAR CMD
2516  005214  067334                  DT1
2517                                   DF10
2518  005216  000000          ;ERROR 152
2519  005220  000000                  0
2520  005222  000000                  0
2521  005224  000000                  0
2522                                   0
2523  005226  000000          ;ERROR 153
2524  005230  000000                  0
2525  005232  000000                  0
2526  005234  000000                  0
2527                                   0
2528  005236  062237          ;ERROR 154
2529  005240  065071                  EM55                    ;ATTN NOT CLEARED
2530  005242  066606                  DH22
2531  005244  067334                  DT1
2532                                   DF10
2533  005246  063527          ;ERROR 155
2534  005250  064734                  EM85                    ;IDAE NOT CLEARED
2535  005252  066606                  DH17                    ;AFTER RECAL CMD
2536  005254  067334                  DT1
2537                                   DF10
2538  005256  060044          ;ERROR 156
2539  005260  066436                  EM12                    ;CONT NOT READY
2540  005262  066606                  DH51                    ;AFTER SEEK TO SELF
2541  005264  067334                  DT1
2542                                   DF10
2543  005266  060075          ;ERROR 157
2544  005270  066436                  EM13                    ;NO ATTN
2545  005272  066606                  DH51
2546  005274  067334                  DT1
2547                                   DF10
                                 ;ERROR 160
```

```
2548  005276  062417          EM59                    ;LIMIT DETECT NOT FOUND
2549  005300  064066          DH1
2550  005302  066606          DT1
2551  005304  067240          DF1
2552                  ;ERROR 161
2553  005306  060223          EM17                    ;MSG A0 ERROR
2554  005310  065702          DH38                    ;AFTER LIMIT DETECT
2555  005312  067054          DT13
2556  005314  067454          DF20
2557                  ;ERROR 162
2558  005316  060236          EM18                    ;MSG B0 ERROR
2559  005320  065702          DH38
2560  005322  067054          DT13
2561  005324  067454          DF20
2562                  ;ERROR 163
2563  005326  060251          EM19                    ;MSG A1 ERROR
2564  005330  065702          DH38
2565  005332  067054          DT13
2566  005334  067454          DF20
2567                  ;ERROR 164
2568  005336  060264          EM20                    ;MSG B1 ERROR
2569  005340  065702          DH38
2570  005342  067054          DT13
2571  005344  067454          DF20
2572                  ;ERROR 165
2573  005346  060075          EM13                    ;NO ATTN
2574  005350  065702          DH38
2575  005352  066606          DT1
2576  005354  067334          DF10
2577                  ;ERROR 166
2578  005356  062450          EM60                    ;HEADS HOME NOT FOUND
2579  005360  065702          DH38
2580  005362  066606          DT1
2581  005364  067334          DF10
2582                  ;ERROR 167
2583  005366  062504          EM61                    ;LOAD HEADS NOT FOUND
2584  005370  065702          DH38
2585  005372  066606          DT1
2586  005374  067334          DF10
2587                  ;ERROR 170
2588  005376  063036          EM72                    ;FORMAT TEST BYPASSED
2589  005400  066155          DH45                    ;LIMIT DETECT ERROR ON PREVIOUS TEST
2590  005402  066606          DT1
2591  005404  067424          DF16
2592                  ;ERROR 171
2593  005406  060044          EM12                    ;NO RDY
2594  005410  065345          DH30                    ;AFTER READ HEADER CMD
2595  005412  066606          DT1
2596  005414  067334          DF10
2597                  ;ERROR 172
2598  005416  061264          EM39                    ;CYL DIFF/OFFSET NOT CLEARED
2599  005420  065345          DH30                    ;AFTER READ HEADER CMD
2600  005422  067114          DT14
2601  005424  067520          DF22
2602                  ;ERROR 173
2603  005426  062540          EM63                    ;DLT SET
```

```
 2604  005430  065345                    DH3C
 2605  005432  066672                    DT5
 2606  005434  067410                    DF15
 2607                            ;ERROR 174
 2608  005436  060277                    EM21                    ;CERR SET
 2609  005440  065345                    DH3C
 2610  005442  066672                    DT5
 2611  005444  067410                    DF15
 2612                            ;ERROR 175
 2613  005446  061264                    EM39                    ;CYL DIFF NOT CLEARED
 2614  005450  064444                    DH1C                    ;AT END OF HEAD LOADING
```

```
 2615  005452  067114                    DT14
 2616  005454  067520                    DF22
 2617                            ;ERROR 176
 2618  005456  061321                    EM40            ;CYL ADDR NOT CLEARED.
 2619  005460  064444                    DH10
 2620  005462  067114                    DT14
 2621  005464  067520                    DF22
 2622                            ;ERROR 177
 2623  005466  063036                    EM72            ;FORMAT TEST BYPASSED
 2624  005470  066231                    DH46            ;COULD NOT READ BSE INFO
 2625  005472  066606                    DT1
 2626  005474  067424                    DF16
 2627                            ;ERROR 200
 2628  005476  060044                    EM12            ;NC RDY
 2629  005500  065720                    DH39            ;AFTER WRITE HEADER CMD
 2630  005502  066672                    DT5
 2631  005504  067364                    DF13
 2632                            ;ERROR 201
 2633  005506  060277                    EM21            ;CERR SET
 2634  005510  065720                    DH39
 2635  005512  066672                    DT5
 2636  005514  067364                    DF13
 2637                            ;ERROR 202
 2638  005516  062610                    EM65            ;READ HEADER ERROR
 2639  005520  064066                    DH1
 2640  005522  066734                    DT7
 2641  005524  067400                    DF14
 2642                            ;ERROR 203
 2643  005526  060223                    EM17            ;MSG AD ERROR
 2644  005530  065462                    DH33            ;DURING SEEK CMD
 2645  005532  067054                    DT13
 2646  005534  067454                    DF20
 2647                            ;ERROR 204
 2648  005536  060236                    EM18            ;MSG BD ERROR
 2649  005540  065462                    DH33
 2650  005542  067054                    DT13
 2651  005544  067454                    DF20
 2652                            ;ERROR 205
 2653  005546  060251                    EM19            ;MSG A1 ERROR
 2654  005550  065462                    DH33
 2655  005552  067054                    DT13
 2656  005554  067454                    DF20
 2657                            ;ERROR 206
 2658  005556  060264                    EM20            ;MSG B1 ERROR
 2659  005560  065462                    DH33
 2660  005562  067054                    DT13
 2661  005564  067454                    DF20
 2662                            ;ERROR 207
 2663  005566  061113                    EM36            ;CYL ADDR IN RKMR3 INCORRECT
 2664  005570  065140                    DH25            ;AFTER SEEK CMD
 2665  005572  066652                    DT4
 2666  005574  067320                    DF6
 2667                            ;ERROR 210
 2668  005576  060277                    EM21            ;CERR SET
 2669  005600  065140                    DH25
 2670  005602  066606                    DT1
```

ERROR POINTER TABLE

```
2671  005604  067334                    DF1C
2672
                                  ;ERROR 211
2673  005606  062664                    EM67          ;READ CYL 0 HEADERS ON CYL 1
2674  005610  065140                    DH25
2675  005612  066606                    DT1
2676  005614  067334                    DF10
2677
                                  ;ERROR 212
2678  005616  061213                    EM38          ;CYL DIFF IN RKMR2 NOT = CALDIF
2679  005620  065462                    DH33          ;DURING SEEK CMD
2680  005622  066652                    DT4
2681  005624  067320                    DF6
2682
                                  ;ERROR 213
2683  005626  060223                    EM17          ;MSG A0 ERROR
2684  005630  066024                    DH41          ;DURING RECAL CMD
2685  005632  067054                    DT13
2686  005634  067454                    DF20
2687
                                  ;ERROR 214
2688  005636  060236                    EM18          ;MSG B0 ERROR
2689  005640  066024                    DH41
2690  005642  067054                    DT13
2691  005644  067454                    DF20
2692
                                  ;ERROR 215
2693  005646  060251                    EM19          ;MSG A1 ERROR
2694  005650  066024                    DH41
2695  005652  067054                    DT13
2696  005654  067454                    DF20
2697
                                  ;ERROR 216
2698  005656  060264                    EM20          ;MSG B1 ERROR
2699  005660  066024                    DH41
2700  005662  067054                    DT13
2701  005664  067454                    DF20
2702
                                  ;ERROR 217
2703  005666  061213                    EM38          ;CYL DIFF IN RKMR2 NOT=CALDIF
2704  005670  066024                    DH41
2705  005672  066652                    DT4
2706  005674  067320                    DF6
2707
                                  ;ERROR 220
2708  005676  060277                    EM21          ;CERR SET
2709  005700  064734                    DH17          ;AFTER RECAL CMD
2710  005702  066606                    DT1
2711  005704  067334                    DF10
2712
                                  ;ERROR 221
2713  005706  060223                    EM17          ;MSG A0 ERROR
2714  005710  064734                    DH17
2715  005712  067054                    DT13
2716  005714  067454                    DF20
2717
                                  ;ERROR 222
2718  005716  060251                    EM19          ;MSG A1 ERROR
2719  005720  064734                    DH17
2720  005722  067054                    DT13
2721  005724  067454                    DF20
2722
                                  ;ERROR 223
2723  005726  061264                    EM39          ;CYL DIFF/OFFSET IN RKMR2 NOT CLEARED
2724  005730  064734                    DH17
2725  005732  066606                    DT1
2726  005734  067334                    DF10
```

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2727
2728  005736  062630          ;ERROR 224
2729  005740  064734                EM66                    ;CYL ADDR IN RKMR3 INCORRECT
2730  005742  066606                DH17
2731  005744  067334                DT1
2732                                 DF10
2733  005746  062723          ;ERROR 225
2734  005750  064734                EM68                    ;READING CYL 1 HEADERS ON CYL 0
2735  005752  066606                DH17
2736  005754  067334                DT1
2737                                 DF10
2738  005756  060044          ;ERROR 226
2739  005760  065157                EM12                    ;NO RDY
2740  005762  066606                DH26                    ;AFTER READ DATA CMD
2741  005764  067334                DT1
2742                                 DF10
2743  005766  060277          ;ERROR 227
2744  005770  065157                EM21                    ;CERR SET
2745  005772  066672                DH26
2746  005774  067410                DT5
2747                                 DF15
2748  005776  063645          ;ERROR 230
2749  006000  066536                EM87                    ;CANT READ BSE INFO
2750  006002  066606                DH53                    ;ON SECT 10,12,14,16,18,20
2751  006004  067434                DT1
2752                                 DF17
2753  006006  000000          ;ERROR 231
2754  006010  000000                0
2755  006012  000000                0
2756  006014  000000                0
2757                                 0
2758  006016  061113          ;ERROR 232
2759  006020  065140                EM36                    ;CYL ADDR IN RKMR3 NOT=RKDC
2760  006022  066630                DH25                    ;AFTER SEEK CMD
2761  006024  067304                DT3
2762                                 DF5
2763  006026  063645          ;ERROR 233
2764  006030  066045                EM87                    ;CANNOT READ BSE INFO
2765  006032  066606                DH42                    ;ON SECT 0,2,4,6,8
2766  006034  067434                DT1
2767                                 DF17
2768  006036  000000          ;ERROR 234
2769  006040  000000                0
2770  006042  000000                0
2771  006044  000000                0
2772                                 0
2773  006046  062762          ;ERROR 235
2774  006050  066105                EM69                    ;ALIGN CARTRIDGE USED
2775  006052  066606                DH44                    ;WILL BYPASS FORMAT & ALL R/W TESTS
2776  006054  067334                DT1
2777                                 DF10
2778  006056  062272          ;ERROR 236
2779  006060  065117                EM56                    ;UNEXP MEM PARITY TRAP
2780  006062  067030                DH23                    ;TEST #, TRAP PC
2781  006064  067270                DT11
2782                                 DF3
                               ;ERROR 237
```

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2783  006066  063015
2784  006070  065071
2785  006072  066606
2786  006074  067334
2787
2788  006076  062723
2789  006100  064734
2790  006102  066606
2791  006104  067334
2792
2793  006106  061113
2794  006110  064642
2795  006112  066754
2796  006114  067320
2797
2798  006116  061213
2799  006120  064642
2800  006122  066754
2801  006124  067320
2802
2803
2804  006126  061113
2805  006130  065140
2806  006132  066754
2807  006134  067320
2808
2809  006136  063104
2810  006140  066024
2811  006142  066606
2812  006144  067334
2813
2814  006146  060075
2815  006150  066330
2816  006152  066606
2817  006154  067334
2818
2819  006156  063131
2820  006160  066330
2821  006162  066652
2822  006164  067320
2823
2824  006166  060725
2825  006170  066330
2826  006172  066652
2827  006174  067320
2828
2829  006176  063157
2830  006200  066330
2831  006202  066652
2832  006204  067320
2833
2834  006206  060176
2835  006210  066330
2836  006212  066652
2837  006214  067320
2838
```

```
                EM71                    ;DSC SET
                DH22                    ;AFTER DRIVE CLEAR CMD
                DT1
                DF10
;ERROR 240
                EM68                    ;READ CYL 1 HEADERS ON CYL 0
                DH17                    ;AFTER RECAL CMD
                DT1
                DF10
;ERROR 241
                EM36                    ;RKMR3 NOT = RKDC
                DH14                    ;AFTER SEEK WITH BAD PARITY
                DT8
                DF6
;ERROR 242
                EM38                    ;CYL DIFF IN RKMR2 INCORRECT
                DH14
                DT8
                DF6

;ERROR 243
                EM36                    ;CYL ADDR IN RKMR3 INCORRECT
                DH25                    ;AFTER SEEK CMD
                DT8
                DF6
;ERROR 244
                EM74                    ;RTZ NOT SET
                DH41                    ;DURING RECAL CMD
                DT1
                DF10
;ERROR 245
                EM13                    ;NO ATTN
                DH48                    ;AFTER SEEK TO INVALID CYL
                DT1
                DF10
;ERROR 246
                EM75                    ;IDAE NOT SET
                DH48
                DT4
                DF6
;ERROR 247
                EM32                    ;FAULT NOT SET
                DH48
                DT4
                DF6
;ERROR 250
                EM76                    ;PIP SET
                DH48
                DT4
                DF6
;ERROR 251
                EM16                    ;DSC NOT SET
                DH48
                DT4
                DF6
;ERROR 252
```

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2839  006216  060223          EM17                    ;MSG A0 ERROR
2840  006220  066330          DH48
2841  006222  067054          DT13
2842  006224  067454          DF20
2843                  ;ERROR 253
2844  006226  060236          EM18                    ;MSG B0 ERROR
2845  006230  066330          DH48
2846  006232  067054          DT13
2847  006234  067454          DF20
2848                  ;ERROR 254
2849  006236  060251          EM19                    ;MSG A1 ERROR
2850  006240  066330          DH48
2851  006242  067054          DT13
2852  006244  067454          DF20
2853                  ;ERROR 255
2854  006246  060264          EM20                    ;MSG B1 ERROR
2855  006250  066330          DH48
2856  006252  067054          DT13
2857  006254  067454          DF20
2858                  ;ERROR 256
2859  006256  061213          EM38                    ;CYL DIFF IN RKMR2 NOT='CYL DIF'
2860  006260  066330          DH48
2861  006262  066652          DT4
2862  006264  067320          DF6
2863                  ;ERROR 257
2864  006266  061113          EM36                    ;CYL ADDR IN RKMR3 NOT=RKDC
2865  006270  066330          DH48
2866  006272  066652          DT4
2867  006274  067320          DF6
2868                  ;ERROR 260
2869  006276  000000          0
2870  006300  000000          0
2871  006302  000000          0
2872  006304  000000          0
2873                  ;ERROR 261
2874  006306  000000          0
2875  006310  000000          0
2876  006312  000000          0
2877  006314  000000          0
2878                  ;ERROR 262
2879  006316  063200          EM77                    ;FAULT NOT CLEARED
2880  006320  065071          DH22                    ;AFTER DRIVE CLEAR CMD
2881  006322  066606          DT1
2882  006324  067334          DF10
2883                  ;ERROR 263
2884  006326  063226          EM78                    ;CYL DIFF IN RKMR2 NOT=1 IN SEEK TO SELF
2885  006330  064642          DH14                    ;AFTER SEEK WITH BAD PARITY
2886  006332  066754          DT8
2887  006334  067320          DF6
2888                  ;ERROR 264
2889  006336  061347          EM41                    ;CYL ADDR NOT CLEARED
2890  006340  065345          DH30                    ;AFTER READ HEADER CMD
2891  006342  067114          DT14
2892  006344  067520          DF22
2893                  ;ERROR 265
2894  006346  060236          EM18                    ;MSG B0 ERROR
```

```
 2895  006350  065071                DH22                    ;AFTER DRIVE CLEAR CMD
 2896  006352  067054                DT13
 2897  006354  067454                DF20
 2898                          ;ERROR 266
 2899  006356  060264                EM20                    ;MSG B1 ERROR
 2900  006360  065071                DH22
 2901  006362  067054                DT13
 2902  006364  067454                DF20
 2903                          ;ERROR 267
 2904  006366  060236                EM18
 2905  006370  065720                DH39                    ;AFTER WRITE HEADER CMD
 2906  006372  067054                DT13
 2907  006374  067454                DF20
 2908                          ;ERROR 270
 2909  006376  060264                EM20
 2910  006400  065720                DH39
 2911  006402  067054                DT13
 2912  006404  067454                DF20
 2913                          ;ERROR 271
 2914  006406  060236                EM18
 2915  006410  065345                DH30                    ;AFTER READ HEADER CMD
 2916  006412  067054                DT13
 2917  006414  067454                DF20
 2918                          ;ERROR 272
 2919  006416  060264                EM20
 2920  006420  065345                DH30
 2921  006422  067054                DT13
 2922  006424  067454                DF20
 2923                          ;ERROR 273
 2924  006426  060223                EM17                    ;MSG A0 ERROR
 2925  006430  065071                DH22                    ;AFTER DRV CLR CMD
 2926  006432  067054                DT13
 2927  006434  067454                DF20
 2928                          ;ERROR 274
 2929  006436  060251                EM19                    ;MSG A1 ERROR
 2930  006440  065071                DH22
 2931  006442  067054                DT13
 2932  006444  067454                DF20
 2933                          ;ERROR 275
 2934  006446  060236                EM18                    ;MSG B0 ERROR
 2935  006450  064734                DH17                    ;AFTER RECAL CMD
 2936  006452  067054                DT13
 2937  006454  067454                DF20
 2938                          ;ERROR 276
 2939  006456  060264                EM20                    ;MSG B1 ERROR
 2940  006460  064734                DH17
 2941  006462  067054                DT13
 2942  006464  067454                DF20
 2943                          ;ERROR 277
 2944  006466  060223                EM17                    ;MSG A0 ERROR
 2945  006470  065720                DH39                    ;AFTER WRITE HEADER CMD
 2946  006472  067054                DT13
 2947  006474  067454                DF20
 2948                          ;ERROR 300
 2949  006476  060251                EM19                    ;MSG A1 ERROR
 2950  006500  065720                DH39
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 2951  006502  067054                    DT13
 2952  006504  067454                    DF20
 2953                            ;ERROR 301
 2954  006506  060223                    EM17
 2955  006510  065345                    DH30                    ;AFTER READ HEADER CMD
 2956  006512  067054                    DT13
 2957  006514  067454                    DF20
 2958                            ;ERROR 302
 2959  006516  060251                    EM19
 2960  006520  065345                    DH30
 2961  006522  067054                    DT13
 2962  006524  067454                    DF20
 2963                            ;ERROR 303
 2964  006526  061264                    EM39                    ;CYL DIFF/OFFSET NOT CLEARED
 2965  006530  065720                    DH39                    ;AFTER WRITE HEADER CMD
 2966  006532  067114                    DT14
 2967  006534  067520                    DF22
 2968                            ;ERROR 304
 2969  006536  061347                    EM41                    ;CYL ADDR NOT CLEARED
 2970  006540  065720                    DH39
 2971  006542  067114                    DT14
 2972  006544  067520                    DF22
 2973
 2974                            ;ERROR 305
 2975  006546  063334                    EM80                    ;UNLD NOT SET
 2976  006550  065732                    DH38                    ;AFTER LIMIT DETECT
 2977  006552  066606                    DT1
 2978  006554  067334                    DF10
 2979                            ;ERROR 306
 2980  006556  063364                    EM81                    ;SPIN NOT SET
 2981  006560  064400                    DH9                     ;AFTER START SPIN CMD.
 2982  006562  066606                    DT1
 2983  006564  067334                    DF10
 2984                            ;ERROR 307
 2985  006566  063412                    EM82                    ;RTZ NOT SET
 2986  006570  066024                    DH41                    ;DURING RECAL CMD
 2987  006572  066606                    DT1
 2988  006574  067334                    DF10
 2989                            ;ERROR 310
 2990  006576  063437                    EM83                    ;READ HEADER ERROR
 2991  006600  064066                    DH1
 2992  006602  066774                    DT9
 2993  006604  067510                    DF21
 2994                            ;ERROR 311
 2995  006606  063437                    EM83
 2996  006610  064066                    DH1
 2997  006612  067012                    DT10
 2998  006614  067510                    DF21
 2999                            ;ERROR 312
 3000  006616  063477                    EM84                    ;FORMAT NOT SET
 3001  006620  065720                    DH39                    ;AFTER WRITE HEADER CMD
 3002  006622  066606                    DT1
 3003  006624  067334                    DF10
 3004                            ;ERROR 313
 3005  006626  063477                    EM84
 3006  006630  065345                    DH30                    ;AFTER READ HEADER CMD
```

```
  3007  006632  066606                    DT1
  3008  006634  067334                    DF10
  3009                              ;ERROR 314
  3010  006636  062315                    EM57            ;WCE AT CYL 411,TRK 2,SEC 21
  3011  006640  064066                    DH1
  3012  006642  067034                    DT12
  3013  006644  067274                    DF4
  3014                              ;ERROR 315
  3015  006646  062351                    EM58            ;SPOK NOT CLEARED
  3016  006650  064754                    DH18            ;AFTER UNLD CMD
  3017  006652  066606                    DT1
  3018  006654  067334                    DF10
  3019                              ;ERROR 316
  3020  006656  063002                    EM70            ;UNEXP ATTN
  3021  006660  064400                    DH9             ;AFTER START SPIN CMD
  3022  006662  066606                    DT1
  3023  006664  067334                    DF10
  3024                              ;ERROR 317
  3025  006666  063002                    EM70
  3026  006670  064473                    DH11            ;AFT SPIN CMD &  FWD SET
  3027  006672  066606                    DT1
  3028  006674  067334                    DF10
  3029                              ;ERROR 320
  3030  006676  063002                    EM70
  3031  006700  064532                    DH12            ;AT INNER LIMIT FROM ST SPIN CMD
  3032  006702  066606                    DT1
  3033  006704  067334                    DF10
  3034                              ;ERROR 321
  3035  006706  063002                    EM70
  3036  006710  064573                    DH13            ;FROM OUTER LIM TO CYL 0 DURING LOADING
  3037  006712  066606                    DT1
  3038  006714  067334                    DF10
  3039                              ;ERROR 322
  3040  006716  060251                    EM19            ;MSG A1 ERROR
  3041  006720  064672                    DH16            ;AFT LD HEAD REG & SEEK
  3042  006722  067054                    DT13
  3043  006724  067454                    DF20
  3044                              ;ERROR 323
  3045  006726  060264                    EM20            ;MSG B1 ERROR.
  3046  006730  064672                    DH16
  3047  006732  067054                    DT13
  3048  006734  067454                    DF20
  3049                              ;ERROR 324
  3050  006736  061614                    EM46            ;MSG A2 ERROR
  3051  006740  064672                    DH16
  3052  006742  067114                    DT14
  3053  006744  067520                    DF22
  3054                              ;ERROR 325
  3055  006746  061627                    EM47            ;MSG B2 ERROR
  3056  006750  064672                    DH16
  3057  006752  067114                    DT14
  3058  006754  067520                    DF22
  3059                              ;ERROR 326
  3060  006756  063063                    EM73            ;CTO SET
  3061  006760  063560                    EM86            ;WHILE WAITING FOR OR REC'D CONTR RDY. MSG A&B BAD
  3062  006762  066606                    DT1
```

```
3063  006764  067250                    DF2
3064                            ;ERROR 327
3065  006766  063313                    EM79                    ;NED SET
3066  006770  063560                    EM86
3067  006772  066606                    DT1
3068  006774  067250                    DF2
3069
3070                            ;ERROR 330
3071  006776  057464                    EM5                     ;MDS SET
3072  007000  063560                    EM86
3073  007002  066606                    DT1
3074  007004  067250                    DF2
```

```
                                        .SBTTL  PROGRAM SETUP
                                
007006  012737  000001  001336  PARSRT: MOV     #1,PARAM        ;SET FLAG FOR 220 START
007014  005037  001340                  CLR     BYPT16
007020  005037  001342                  CLR     MODTST
007024  000450                          BR      PRGSRT          ;START PROGRAM
                                
007026  005037  001336          BYT16:  CLR     PARAM
007032  012737  000001  001340          MOV     #1,BYPT16       ;SET FLAG TO BYPASS TEST 16
007040  005037  001342                  CLR     MODTST
007044  000440                          BR      PRGSRT
                                
007046  012737  000001  001336  BYT16A: MOV     #1,PARAM
007054  012737  000001  001340          MOV     #1,BYPT16
007062  005037  001342                  CLR     MODTST
007066  000427                          BR      PRGSRT
                                
007070  005037  001336          MDTST:  CLR     PARAM
007074  005037  001340                  CLR     BYPT16
007100  012737  000001  001342          MOV     #1,MODTST
007106  000417                          BR      PRGSRT
                                
007110  005037  001336          MDTSTA: CLR     PARAM
007114  012737  000001  001340          MOV     #1,BYPT16
007122  012737  000001  001342          MOV     #1,MODTST
007130  000406                          BR      PRGSRT
007132  105037  001336          START:  CLRB    PARAM           ;CLEAR FOR 200 START
007136  005037  001340                  CLR     BYPT16
007142  005037  001342                  CLR     MODTST
007146  000005                  PRGSRT: RESET                   ;CLEAR ALL INT ENABLE & INIT
007150  012706  001100                  MOV     #STACK,SP       ;SETUP STACK POINTER
007154  012746  000000                  MOV     #PR0,-(SP)      ;PSW LOADED TO BE
007160  012746  007166                  MOV     #1$,-(SP)       ;LSI-11 COMPATABLE
```

```
                        RTI                     ;ENABLE ALL INTERRORUPTS

007166  004737  052556  1$:     JSR     PC,$TKINT       ;SETUP KB VECTOR ADDR, PRIORITY 4
                                                        ;& TURN ON KB INTERRORUPT



                        ;*** CPU PRIORITY LEVEL NOW AT 0 ***
                        ;*** ANY DEVICE WHICH SETS ITS   ***
                        ;*** INTERRORJPT ENABLE BIT WILL   ***
                        ;*** SERVICED.                   ***

                        ;CLOCK INTERRORUPTS WILL CHANGE CPU PRIORITY TO LEVEL 6 (IN 'ST5',
                        ;RK06 CONTROLLER INTERRORUPTS WILL CHANGE CPU PRIORITY TO LEVEL 5 IN 'SETINT')
                        ;KEYBOARD INTERRORUPTS WILL CHANGE CPU PRIORITY TO LEVEL 4 (SEE ABOVE)

                        ;ALL 'SYSMAC' TRAPS WILL CHANGE CPU PRIORITY TO LEVEL 7 (SEE BELOW)

                                                        ;SYSMAC 'SETUP'
                        .SBTTL  INITIALIZE THE COMMON TAGS
                        ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
007172  012706  001100          MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
007176  005026                  CLR     (R6)+           ;;CLEAR MEMORY LOCATION
007200  022706  001140          CMP     #SWR,R6 ;;DONE?
007204  001374                  BNE     .-6             ;;LOOP BACK IF NO
007206  012706  001100          MOV     #STACK,SP       ;;SETUP THE STACK POINTER
                        ;;INITIALIZE A FEW VECTORS
007212  012737  050664  000020  MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
007220  012737  000340  000022  MOV     #340,@#IOTVEC+2 ;;LEVEL 7
007226  012737  051144  000030  MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
007234  012737  000340  000032  MOV     #340,@#EMTVEC+2 ;;LEVEL 7
007242  012737  054662  000034  MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
007250  012737  000340  000036  MOV     #340,@#TRAPVEC+2;LEVEL 7
007256  012737  050576  000024  MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
007264  012737  000340  000026  MOV     #340,@#PWRVEC+2 ;;LEVEL 7
007272  013737  043552  043544  MOV     $ENDCT,$EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
007300  005037  001174          CLR     $TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
007304  005037  001176          CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
007310  112737  000001  001115  MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
007316  012737  007316  001106  MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
007324  012737  007324  001110  MOV     #.,$LPERR       ;;SETUP THE ERROR LOOP ADDRESS
                        ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
                        ;;EQUAL TO A "-1", SETUP FOR A SOFTWARE SWITCH REGISTER.
007332  013746  000004          MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
007336  012737  007372  000004  MOV     #64$,@#ERRVEC   ;;SET UP ERROR VECTOR
007344  012737  177570  001140  MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
007352  012737  177570  001142  MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
007360  022777  177777  171552  CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
007366  001012                  BNE     66$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
                                                        ;;AND  THE HARDWARE SWR IS NOT = -1
007370  000403                  BR      65$             ;;BRANCH IF NO TIMEOUT
007372  012716  007400  64$:    MOV     #65$,(SP)       ;;SET UP FOR TRAP RETURN
007376  000002                  RTI
007400  012737  000176  001140  65$:    MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
007406  012737  000174  001142          MOV     #DISPREG,DISPLAY
007414  012637  000004          66$:    MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR
```

```
                                        CLR     $PASS                   ;;CLEAR PASS COUNT
                                        BITB    #APTSIZE,$ENVM          ;;TEST USER SIZE UNDER APT
                                        BEQ     67$                     ;;YES,USE NON-APT SWITCH
                                        MOV     #$SWREG,SWR             ;;NO,USE APT SWITCH REGISTER
                                67$:
                                MEMPAR: MOV     #1$,ERRVEC              ;SET TIMEOUT VECTOR
                                        MOV     #PR7,ERRVEC+2

                                        MOV     #MEMBAS,R1              ;ADDR OF MEM CSR
                                3$:     CLR     (R1)                    ;SEE IF CAN REFERENCE
                                        MOV     #1,(R1)                 ;SET ENABLE BIT IF YES
                                        MOV     #MEMERR,MEMVEC          ;LOAD MEMORY CHECK VECTOR IF NO TIMEOUT
                                        MOV     #PR7,MEMVEC+2
                                        BR      2$

                                1$:     CMP     (SP)+,(SP)+             ;ADJ STACK
                                2$:     ADD     #2,R1                   ;TRY NEXT CSR
                                        CMP     R1,#MEMBAS+40           ;SEE IF TRIED ALL
                                        BNE     3$                      ;BR IF NO
                                        MOV     #ERRVEC+2,ERRVEC                ;RESTORE TRAP CATCHER
                                        CLR     ERRVEC+2

                                        JSR     PC,CLRFLG               ;CLEAR DDUMP THRU SIZFLG
                                        CLR     $DEVCT
                                        CLR     $UNIT


                                ;
                                ;FIND OUT IF XXDP, ACT, APT; CHAIN OR DUMP MODE
                                ;

                                START1: TST     42
                                        BNE     1$                      ;BR IF AUTO
                                        JSR     PC,TITLE                ;MANUAL, TYPE PROG ID
                                        CMPB    41,#13                  ;13=LOADED BY XXDP
                                        BNE     2$
                                        INC     DDUMP                   ;SET RK06 DUMP MODE FLAG
                                        TYPE    ,MSG2                   ;REPLACE DRO PACK W/SCRATCH & DO<CR>
                                        JMP     ST2
                                1$:     JMP     ST3
                                2$:     INC     PPTP                    ;SET ACT/APT/PTP DUMP MODE FLAG


                                ;
                                ;CHECK IF ALL PARAMETERS DEFAULTED.  IF NOT, BEGIN INPUT DIALOGJE
                                ;WITH OPERATOR.  THE REPLY TO 'DRIVES TO BE TESTED' SHOULD BE
                                ;DRIVE NOS.  SEPERATED BY COMMAS & TERMINATED BY <CR>
                                ;       EX:     DRIVES TO BE TESTED:  1,2,4<CR>
                                ;


                                ST2:    TST     PARAM
                                        BNE     1$                      ;BR IF 220 START
                                        JMP     ST4                     ;200 START, DEFAULT & SIZE THE BUSS
                                1$:     TYPE    ,MSG3                   ;DRIVES TO BE TESTED
                                        JSR     PC,GDRVS                ;GET DR NOS.
                                        TYPE    ,MSG4                   ;BUSS ADDR
                                        JSR     PC,GBA                  ;GET BA
                                        TYPE    ,MSG5                   ;CONT INT VECTOR
```

```
3221  007654  004737  044126                  JSR     PC,GINT         ;GET INT VECTOR
3222  007660  000427                          BR      ST5
3223
3224                                          ;
3225                                          ;AUTO MODE
3226                                          ;CHECK IF LOADED BY XXDP OR OTHER.  SET FLAGS & NO INPUT DIALOGUE.
3227                                          ;DEFAULT ALL PARAMETERS.  TEST ONLY THOSE DRIVES THAT ARE READY
3228                                          ;ON THE BUSS
3229                                          ;
3230
3231  007662  123727  000041  000013  ST3:    CMPB    41,#13          ;13=LOADED BY XXDP
3232  007670  001007                          BNE     1$
3233  007672  005237  003476                  INC     DDPCH           ;SET RK06 CHAIN MODE FLAG
3234  007676  004737  043660                  JSR     PC,TITLE
3235  007702  104401  050201                  TYPE    ,MSG7           ;DRO NOT TSTD
3236  007706  000402                          BR      ST4
3237  007710  005237  003450          1$:     INC     ACT11           ;SET ACT AUTO FLAG.
3238
3239  007714  012737  177440  001264  ST4:    MOV     #177440,$BASE   ;DEFAULT VALUE
3240  007722  012737  000210  001314          MOV     #210,RKVEC      ;DEFAULT VALUE
3241  007730  004737  044160                  JSR     PC,SETINT
3242  007734  005237  003504                  INC     SIZFLG          ;DO "SIZE THE BUSS" TEST
3243
```

```
 3244  007740  005037  003316          5$5:    CLR     UNLD            ;INITIALIZE FLAGS
 3245  007744  005037  003320                  CLR     BADHDR                  ;USED IN 'STOP ROUTINE
 3246  007750  005037  003322                  CLR     HPEND                   ;FOR VALID PROGRAM HALTS
 3247  007754  012737  003456  001346          MOV     #DRIVQ,DRVPTR   ;SETUP
 3248  007762  005037  001220                  CLR     $DEVCT          ;NO. OF DRVS DONE
 3249  007766  005037  001222                  CLR     $UNIT           ;CURRENT DRV UNDER TEST
 3250  007772  012737  010340  000004          MOV     #1$,ERRVEC      ;SETUP TIMEOUT ERROR VECTOR
 3251  010000  005777  171322                  TST     @LKS            ;SEE IF L-CLOCK THERE
 3252  010004  005237  003476                  INC     LCLKF           ;PRESENT, SET FLAG.
 3253  010010  013700  001330                  MOV     LCVEC,R0        ;VECTOR ADDR
 3254  010014  012737  010102  000004          MOV     #2$,ERRVEC
 3255  010022  005777  171272                  TST     @PKS            ;SEE IF P-CLOCK THERE
 3256  010026  005237  003500                  INC     PCLKF           ;PRESENT, SET FLAG
 3257  010032  013700  001332                  MOV     PCVEC,R0        ;VECTOR ADDR
 3258  010036  000412                          BR      3$
 3259
 3260  010040  022626          1$:     CMP     (SP)+,(SP)+     ;L-CLOCK NOT THERE, CLEAR STACK
 3261  010042  012737  010106  000004          MOV     #4$,ERRVEC
 3262  010050  005777  171244                  TST     @PKS            ;SEE IF P-CLOCK THERE
 3263  010054  005237  003500                  INC     PCLKF           ;PRESENT, SET FLAG
 3264  010060  013700  001332                  MOV     PCVEC,R0        ;VECTOR ADDR
 3265  010064  005237  003502          3$:     INC     DOTIM           ;INDICATES TIMING TESTS CAN BE DONE
 3266  010070  012720  047654                  MOV     #CLOCK,(R0)+    ;SERVICE ROUTINE FOR CLOCKS
 3267  010074  012710  000300                  MOV     #PR6,(R0)
 3268  010100  000407                          BR      TST1            ;;GO TO NEXT TEST
 3269
 3270  010102  022626          2$:     CMP     (SP)+,(SP)+     ;P-CLOCK NOT THERE, CLEAR STACK
 3271  010104  000767                          BR      3$
 3272
 3273  010106  022626          4$:     CMP     (SP)+,(SP)+     ;NEITHER CLOCK THERE, CLEAR STACK
 3274  010112  005037  003502                  CLR     DOTIM           ;TIMING TESTS CANNOT BE DONE.
 3275  010116  104401  056440                  TYPE    .MSG13          ;ALL TIMING TESTS BYPASSED
```

```
                        .SBTTL BASIC CONTROLLER TESTS, SIZING & SETUP

                        ;;*****************************************************************
                        ;*TEST 1        REFERENCE ALL CONTROLLER REGISTERS
                        ;*
                        ;*      THIS TEST VERIFIES THAT ALL THE CONTROLLER REGISTERS
                        ;*      CAN BE ACCESSED.  THE INABILITY  TO BE ACCESSED WILL
                        ;*      RESULT IN A TIMEOUT TRAP WITH  AN ERROR MSG.  ANY
                        ;*      ERROR IN THIS TEST WILL RESULT IN ABORTING ALL OTHER
                        ;*      TESTS AND JUMPING TO  'END OF PASS'
                        ;*
                        ;;*****************************************************************
010120  000004         TST1:   SCOPE
010122  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
010130  012706  001100          MOV     #STACK,SP       ;RESTORE STK PTR
                        
010134  012746  000000          MOV     #PR0,-(SP)      ;RESET PSW TO PRIORITY 0
010140  012746  010146          MOV     #5$,-(SP)       ;& MAKE IT LSI COMPATABLE
010144  000002                  RTI
010146                  5$:
                        
010146  012737  010264  000004          MOV     #1$,ERRVEC      ;SETUP TIMOUT ERROR VECTOR
010154  013705  001264          MOV     $BASE,R5        ;SETUP INDEX REG.
010160  005765  000000          TST     RKCS1(R5)       ;REFERENCE ALL THE
010164  005765  000010          TST     RKCS2(R5)       ;CONTROLLER REGISTERS
010170  005765  000002          TST     RKWC(R5)
010174  005765  000004          TST     RKBA(R5)
010200  005765  000006          TST     RKDA(R5)
010204  005765  000012          TST     RKCS(R5)        ;TIMEOUTS IN THIS SECTION
010210  005765  000014          TST     RKER(R5)        ;INDICATE THAT THE CONTROLLER
010214  005765  000016          TST     RKASOF,R5.      ;REGISTERS CANNOT BE READ.
```

```
3309  010220  005765  000020          TST     RKDC(R5)          ;TESTING SHOULD NOT PROCEED
3310  010224  005765  000024          TST     RKCB(R5)          ;UNTIL THIS IS REMEDIED.
3311  010230  005765  000026          TST     RKMR1(R5)
3312  010234  005765  000034          TST     RKMR2(R5)
3313  010240  005765  000036          TST     RKMR3(R5)
3314  010244  005765  000030          TST     RKECPS(R5)
3315  010250  005765  000032          TST     RKECPT(R5)
3316
3317  010254  012737  050426  000004  MOV     #BADTMO,ERRVEC    ;SETUP TIMEOUT HANDLER
3318  010262  000404                  BR      TST2              ;;GO TO NEXT TEST
3319
3320  010264  022626                  1$:     CMP     (SP)+,(SP)+       ;RESTORE STACK POINTER
3321  010266  104007                          ERROR   7                 ;ABORT-COULD NOT REFERENCE CONTROLLER REGISTER
3322  010270  000137  043516                  JMP     $EOP1
3323
```

```
                                ;;*****************************************************************
                                ;*TEST 2         SIZE THE BUSS
                                ;*
                                ;*      THIS TEST IS ENTERED ONLY IF 'DRIVE SELECTION' IS DEFAULTED
                                ;*      EITHER BY RUNNING IN THE AUTO MODE OR A 200 START IN THE
                                ;*      MANUAL MODE.
                                ;*      EVERY DRIVE FROM 0 THRU 7 IS ADDRESSED.
                                ;*      CONTROLLER ERROR (CERR) IS EXAMINED AND IF NOT SET, THE
                                ;*      DRIVE WILL BE TESTED.  IF SET, THE PROGRAM WILL BYPASS
                                ;*      TESTING THAT DRIVE ONLY IF THE ERROR WAS A RESULT OF
                                ;*      MDS, UFE OR NED BEING SET; OR BOTH NED & DRA RESET IN-
                                ;*      DICATING THE OTHER PORT IS ACCESSED.
                                ;*
                                ;;*****************************************************************
010274  000004                  TST2:   SCOPE
010276  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
010304  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
010310  005237  001462                  INC     BYPCERR         ;DO NOT TEST CERR IN 'FRDY'
                
010314  132737  000200  001231          BITB    #BIT7,$ENVM     ;SEE IF USE APT SELECTED DRIVES
010322  001002                          BNE     14$             ;BR IF YES
010324  000137  010440                  JMP     12$             ;ELSE DO NORM SIZING OR VERIFY

010330  104401  056322          14$:    TYPE    ,MSG10          ;WILL TEST DRIVES
010334  005037  003454                  CLR     DRVS            ;# OF DRIVES PRESENT
010340  005000                          CLR     R0              ;DRV ADDR
010342  012701  003456                  MOV     #DRV0,R1        ;DRV FLAG
010346  013702  001266                  MOV     $DEVM,R2        ;APT DEVICE MAP

010352  032702  000001          15$:    BIT     #BIT0,R2        ;SEE IF DRV IN DEVICE MAP
010356  001410                          BEQ     16$             ;BR IF NO
010360  005237  003454                  INC     DRVS            ;ELSE INCR DRIVE COUNT
010364  005211                          INC     (R1)            ;& SET DRIVE PRESENT FLAG
010366  104401  001205                  TYPE    ,$CRLF
010372  010046                          MOV     R0,-(SP)        ;;SAVE R0 FOR TYPEOUT
                                                                ;;TYPE DRIVE #
010374  104403                          TYPOS                   ;;GO TYPE--OCTAL ASCII
010376     001                          .BYTE   1               ;;TYPE 1 DIGIT(S)
010377     000                          .BYTE   0               ;;SUPPRESS LEADING ZEROS

010400  005721          16$:    TST     (R1)+           ;ADV POINTER TO NEXT FLAG
010402  005200                  INC     R0              ;INC DRIVE #
010404  022700  000010          CMP     #8.,R0          ;ALL 8 TESTED?
010410  001402                  BEQ     17$             ;BR IF YES

010412  006002                  ROR     R2              ;ELSE GET NEXT BIT OFF DEVICE MAP
010414  000756                  BR      15$             ;& TRY AGAIN

010416  005737  003454  17$:    TST     DRVS            ;SEE IF MORE DRIVES PRESENT
010422  001402                  BEQ     18$             ;BR IF NO
010424  000137  011356          JMP     NUDRV           ;ELSE EXIT TEST

010430  104126  18$:    ERROR   126             ;NO DRIVES FOUND IN $DEVM
010432  000000                  HALT            ;SETUP CORRECTLY & PRESS 'CONTINUE'
010434  000137  007740          JMP     ST5             ;TO TRY AGAIN
```

```
3380
3381  010440  012765  000040  000010  12$:    MOV     #SCLR,RKCS2(R5) ;SUBSYSTEM CLEAR
3382  010446  013737  001414  003372          MOV     T10,TEMP1
3383  010454  004737  044176                  JSR     PC,FRDY         ;FIND RDY
3384  010460  104120                          ERROR   120             ;RDY NOT SET BY END OF SCLR
3385  010462  005737  003504                  TST     SIZFLG
3386  010466  001562                          BEQ     TST3            ;;DO NOT SIZE, GOTO NEXT TEST
3387  010470  104401  056322                  TYPE    ,MSG10          ;WILL TEST DRIVES
3388  010474  005037  003454                  CLR     DRIVS           ;# OF DRIVES PRESENT
3389  010500  005000                          CLR     R0              ;DRV ADDR
3390  010502  012701  003456                  MOV     #DRIV0,R1       ;DRV FLAG
3391  010506                          1$:
3392  010506  104415                          SCOP1
3393  010510  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
3394
3395  010514  012765  000040  000010          MOV     #SCLR,RKCS2(R5) ;SUBSYS CLEAR
3396  010522  013737  001414  003372          MOV     T10,TEMP1
3397  010530  004737  044176                  JSR     PC,FRDY         ;FIND RDY
3398  010534  104120                          ERROR   120             ;RDY NOT SET BY END OF SCLR
3399  010536  010065  000010                  MOV     R0,RKCS2(R5)    ;SELECT THE DRIVE ADDR
3400  010542  012765  000001  000000          MOV     #SELDRV,RKCS1(R5)
3401  010550  013737  001414  003372          MOV     T10,TEMP1
3402  010556  004737  044176                  JSR     PC,FRDY         ;FIND RDY
3403  010562  104117                          ERROR   117             ;NO RDY AFTER SELECT DR. CMD
3404  010564  032737  100000  003334          BIT     #CERR,HCS1
3405  010572  001046                          BNE     2$
3406  010574  013737  003362  003372          MOV     HMR2,TEMP1
3407  010602  042737  177770  003372          BIC     #^C<DRVMSK>,TEMP1
3408  010610  020037  003372                  CMP     R0,TEMP1        ;S/B SAME
3409  010614  001016                          BNE     3$
3410  010616  005700                          TST     R0
3411  010620  001003                          BNE     4$
3412  010622  005737  003446                  TST     DDPCH           ;SEE IF XXDP CHAIN MODE
3413  010626  001014                          BNE     5$
3414  010630  005237  003454          4$:     INC     DRIVS           ;INC DRIVE COUNT.
3415  010634  005211                          INC     (R1)            ;SET DRIVE PRESENT FLAG
3416  010636  104401  001205                  TYPE    ,$CRLF
3417  010642  010046                          MOV     R0,-(SP)        ;;SAVE R0 FOR TYPEOUT
3418                                                                  ;;TYPE DR #
3419  010644  104403                          TYPOS                   ;;GO TYPE--OCTAL ASCII
3420  010646     001                          .BYTE   1               ;;TYPE 1 DIGIT(S)
3421  010647     000                          .BYTE   0               ;;SUPPRESS LEADING ZEROS
3422  010650  000403                          BR      5$
3423
3424  010652  004737  044704          3$:     JSR     PC,BYP          ;TYPE BYPASS DR #
3425  010656  104001                          ERROR   1               ;SELECTED DR # DOES NOT MATCH RKMR2 DR #
3426
3427  010660  005721                  5$:     TST     (R1)+           ;ADVANCE PTR TO NEXT DR. FLAG
3428  010662  005200                          INC     R0              ;INC DR #
3429  010664  022700  000010                  CMP     #8.,R0
3430  010670  001306                          BNE     1$              ;MORE LEFT.
3431  010672  005737  003454                  TST     DRIVS
3432  010676  001054                          BNE     10$
3433  010700  104123                          ERROR   123             ;NO DRIVES FOUND
3434  010702  000000                          HALT                    ;SETUP CORRECTLY
3435  010704  000137  007740                  JMP     ST5             ;& PRESS 'CONT'
```

```
3436
3437  010710  032737  001000  003336  2$:     BIT     #MDS,HCS2
3438  010716  001015                          BNE     6$
3439  010720  032737  000400  003336          BIT     #UFE,HCS2
3440  010726  001015                          BNE     7$
3441  010730  032737  000001  003346          BIT     #DRA,HDS
3442  010736  001015                          BNE     8$
3443  010740  032737  010000  003336          BIT     #NED,HCS2
3444  010746  001424                          BEQ     9$
3445  010750  000743                          BR      5$
3446
3447  010752  004737  044704          6$:     JSR     PC,BYP          ;TYPE BYP DR #
3448  010756  104002                          ERROR   2               ;MDS DETECTED
3449  010760  000737                          BR      5$
3450
3451  010762  004737  044704          7$:     JSR     PC,BYP
3452  010766  104003                          ERROR   3               ;UFE DETECTED
3453  010770  000733                          BR      5$
3454
3455  010772  032737  010000  003336  8$:     BIT     #NED,HCS2
3456  011000  001713                          BEQ     4$
3457  011002  104401  056541                  TYPE    ,MSG15          ;DRV#
3458  011006  010046                          MOV     R0,-(SP)        ;;SAVE R0 FOR TYPEOUT
3459                                                                  ;;TYPE DR#
3460  011010  104403                          TYPOS                   ;;GO TYPE--OCTAL ASCII
3461  011012     001                          .BYTE   1               ;;TYPE 1 DIGIT(S)
3462  011013     000                          .BYTE   0               ;;SUPPRESS LEADING ZEROS
3463  011014  104010                          ERROR   10              ;DRA & NED BOTH SET
3464  011016  000720                          BR      5$
3465
3466  011020  004737  044704          9$:     JSR     PC,BYP
3467  011024  104004                          ERROR   4               ;NO DRA & NO NED = OTHER PORT SELECTED
3468  011026  000714                          BR      5$
3469  011030  000137  011356          10$:    JMP     NUDRV
3470
3471                                          ;;*****************************************************************
3472                                          ;*TEST 3        VERIFY OPERATOR DRIVE SELECTIONS
3473                                          ;*
3474                                          ;*      THIS TEST IS ENTERED ONLY IF DRIVE SELECTION IS NOT
3475                                          ;*      DEFAULTED.  EVERY DRIVE FROM 0 TO 7 IS ADDRESSED &
3476                                          ;*      CONTROLLER ERROR (CERR) IS EXAMINED. IF NOT SET, THE
3477                                          ;*      PROGRAM WILL ASSUME THE DRIVE IS PRESENT.  IT WILL THEN CHECK
3478                                          ;*      TO SEE THAT THE DRIVE WAS INPUTTED FOR TESTING.  IF NOT, IT WILL
3479                                          ;*      BE AN ERROR.  IF CERR WAS SET, THAT DRIVE WILL BE BYPASSED
3480                                          ;*      ONLY IF THE ERROR WAS A RESULT OF MDS OR UFE SET OR BOTH
3481                                          ;*      NED & DRA RESET (WRONG PORT).  IF CERR IS  A RESULT OF
3482                                          ;*      NED ONLY, IT IS CHECKED AGAINT THE INPUTTED INFOR TO
3483                                          ;*      VERIFY IT WAS NOT SPECIFIED.
3484                                          ;*
3485                                          ;*****************************************************************
3486  011034  000004                          TST3:   SCOPE
3487  011036  012737  000001  001174                  MOV     #1,$TIMES       ;;DO 1 ITERATION
3488  011044  012706  001100                          MOV     #STACK,SP       ;RESTORE STK PTR
3489  011050  005000                          CLR     R0                      ;DRIVE ADDR
3490  011052  012701  003456                  MOV     #DRIVD,R1               ;DRIVE FLAG
3491  011056                          1$:
```

```
3492  011056  104415                          SCOP1
3493  011060  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
3494
3495  011064  012765  000040  000010          MOV     #SCLR,RKCS2(R5)
3496  011072  013737  001414  003372          MOV     T10,TEMP1
3497  011100  004737  044176                  JSR     PC,FRDY         ;FIND RDY
3498  011104  104120                          ERROR   120             ;NO RDY AFTER SCLR
3499  011106  010065  000010                  MOV     R0,RKCS2(R5)    ;DRV ADDR
3500  011112  012765  000001  000000          MOV     #SELDRV,RKCS1(R5)
3501  011120  013737  001414  003372          MOV     T10,TEMP1
3502  011126  004737  044176                  JSR     PC,FRDY         ;FIND RDY
3503  011132  104117                          ERROR   117             ;NO RDY AFTER SELDRV CMD
3504  011134  032737  100000  003334          BIT     #CERR,HCS1
3505  011142  001036                          BNE     2$
3506  011144  013737  003362  003372          MOV     HMR2,TEMP1
3507  011152  042737  177770  003372          BIC     #^C<DRVMSK>,TEMP1
3508  011160  020037  003372                  CMP     R0,TEMP1        ;S/B SAME
3509  011164  001010                          BNE     3$
3510  011166  005711                  11$:    TST     (R1)
3511  011170  001417                          BEQ     5$
3512  011172  005721                  4$:     TST     (R1)+           ;SHIFT PTR TO NEXT DR FLAG
3513  011174  005200                          INC     R0              ;INC DR#
3514  011176  022700  000010                  CMP     #8.,R0
3515  011202  001325                          BNE     1$              ;MORE LEFT
3516  011204  000466                          BR      TST4            ;;GO TO NEXT TEST
3517
3518  011206  004737  044704          3$:     JSR     PC,BYP          ;TRY BYPASS DRIVE#
3519  011212  104001                          ERROR   1               ;WRITTEN DR# DOES NOT MATCH RKMR2 DR#
3520  011214  005711                          TST     (R1)
3521  011216  001765                          BEQ     4$              ;BRANCH IF NOT SPEC BY INPUT
3522  011220  005337  003454          12$:    DEC     DRIVS           ;DECREMENT TOTAL DRIVS
3523  011224  005011                          CLR     (R1)            ;CLEAR DRIVE FLAG
3524  011226  000761                          BR      4$
3525
3526  011230  004737  044704          5$:     JSR     PC,BYP
3527  011234  104005                          ERROR   5               ;DR PRESENT BUT NOT SPECIFIED BY OPERATOR
3528  011236  000755                          BR      4$
3529
3530  011240  032737  001000  003336  2$:     BIT     #MDS,HCS2
3531  011246  001027                          BNE     6$
3532  011250  032737  000400  003336          BIT     #UFE,HCS2
3533  011256  001027                          BNE     7$
3534  011260  032737  000001  003346          BIT     #DRA,HDS
3535  011266  001005                          BNE     8$
3536  011270  032737  010000  003336          BIT     #NED,HCS2
3537  011276  001423                          BEQ     9$
3538  011300  000404                          BR      10$
3539  011302  032737  010000  003336  8$:     BIT     #NED,HCS2
3540  011310  001726                          BEQ     11$
3541  011312  005711                  10$:    TST     (R1)
3542  011314  001726                          BEQ     4$
3543
3544  011316  004737  044704                  JSR     PC,BYP          ;TYPE BYPASS DRIVE#
3545  011322  104006                          ERROR   6
3546  011324  000735                          BR      12$
3547
```

```
 3548  011326  004737  044704        6$:     JSR     PC,BYP          ;TYPE BYPASS DRIVE#
 3549  011332  104002                        ERROR   2               ;MDS DETECTED
 3550  011334  000762                        BR      8$
 3551
 3552  011336  004737  044704        7$:     JSR     PC,BYP
 3553  011342  104003                        ERROR   3               ;UFE DETECTED
 3554  011344  000756                        BR      8$
 3555
 3556  011346  004737  044704        9$:     JSR     PC,BYP
 3557  011352  104004                        ERROR   4               ;DRA & NED RESET - OTHER PORT SELECTED
 3558  011354  000752                        BR      8$
 3559
 3560
 3561                                        ;
 3562                                        ;THIS PART OF THE PROGRAM WILL BE REPEATED FOR EACH
 3563                                        ;DRIVE PRESENT
 3564                                        ;
 3565                                        ;'SUNIT' CONTAINS THE ADDRESS OF THE DRIVE CURRENTLY
 3566                                        ;UNDER TEST
```

```
                                ;;*****************************************************************
                                ;*TEST 4         FIND NEXT DRIVE TO BE TESTED
                                ;*
                                ;*      THIS TEST FINDS THE NEXT DRIVE PRESENT & PUTS THAT
                                ;*      ADDRESS IN '$UNIT'.
                                ;*      THROUGHOUT THE FOLLOWING TESTS, THE DRIVE TESTED IS
                                ;*      THE DRIVE WHOSE ADDRESS IS IN '$UNIT'.
                                ;*
                                ;;*****************************************************************
011356  005037  001462          NUDRV:  CLR     BYPCERR         ;ENTER HERE FROM LAST TEST
                                                                ;& TEST CERR IN 'FRDY'
011362  000004                  TST4:   SCOPE
011364  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
011372  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
011376  012737  000004  001214          MOV     #STN-1,$TESTN
011404  012737  000004  001102          MOV     #STN-1,$TSTNM

011412  005737  003454                  TST     DRIVS           ;ANY DRIVES PRESENT?
011416  001004                          BNE     4$              ;YES BRANCH
011420  104401  056642                  TYPE    ,MSG19          ;ALL DRIVES TESTED
011424  000137  043516                  JMP     $EOP1           ;NO, GO TO END

011430  013701  001346          4$:     MOV     DRVPTR,R1       ;ADDR OF NEXT DRIVE FLAG
011434  005737  001220                  TST     $DEVCT          ;IS FIRST DRIVE BEING CHECKED
011440  001402                          BEQ     2$              ;YES, BRANCH
011442  005237  001222          1$:     INC     $UNIT           ;INCR DRIVE ADDR TO NEXT DRIVE
011446  005721                  2$:     TST     (R1)+           ;IS DRIVE PRESENT?
011450  001774                          BEQ     1$              ;NO,FIND NEXT DRIVE PRESENT
011452  005737  003446                  TST     DDPCH           ;DDP CHAIN MODE?
011456  001403                          BEQ     3$              ;NO, BRANCH.
011460  005737  001222                  TST     $UNIT           ;YES, IS IT DRIVE 0?
011464  001766                          BEQ     1$              ;IF YES, DON'T TEST DR 0
011466  010137  001346          3$:     MOV     R1,DRVPTR       ;STORE POINTER TO THE NEXT DR. FLAG
011472  104401  056541                  TYPE    ,MSG15          ;"DRIVE"
011476  013700  001222                  MOV     $UNIT,R0
011502  010046                          MOV     R0,-(SP)        ;;SAVE R0 FOR TYPEOUT
                                                                ;;DRIVE #
011504  104403                          TYPOS                   ;;GO TYPE--OCTAL ASCII
011506     001                          .BYTE   1               ;;TYPE 1 DIGIT(S)
011507     000                          .BYTE   0               ;;SUPPRESS LEADING ZEROS

011510  104401  001205                  TYPE    ,$CRLF

                                ;;*****************************************************************
                                ;*TEST 5         UNLOAD DRIVE TO BE TESTED
                                ;*
                                ;*      THIS TEST UNLOADS THE DRIVE TO BE TESTED NEXT.
                                ;*      WAITS FOR ATTN & VERIFIES IT CAME FROM  THE CORRECT DRIVE.
                                ;*      IT THEN WAITS FOR SPEED OK TO GO LOW BEFORE
                                ;*      PROCEEDING TO THE NEXT TEST
                                ;*
                                ;;*****************************************************************
011514  000004                  TST5:   SCOPE
011516  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
```

```
 3623  011524  012706  001100                  MOV     #STACK,SP
 3624
 3625  011530  005237  003316                  INC     UNLD            ;USED TO CHECK VALID HALT
 3626
 3627  011534  004737  046106                  JSR     PC,SUBCLR
 3628  011540  104024                          ERROR   24              ;CERR AFTER SCLR
 3629
 3630  011542  012765  000007  000000          MOV     #UNLOAD,RKCS1(R5)       ;UNLOAD CMD
 3631  011550  013737  001414  003372          MOV     T10,TEMP1
 3632  011556  004737  044176                  JSR     PC,FRDY         ;FIND RDY
 3633  011562  104011                          ERROR   11              ;RDY NOT SET AFTER UNLOAD CMD.
 3634  011564  004737  044460                  JSR     PC,TSTATN
 3635  011570  104012                          ERROR   12              ;NO ATTN AFTER UNLOAD CMD
 3636
 3637  011572  004737  046106                  JSR     PC,SUBCLR
 3638  011576  104024                          ERROR   24              ;CERR AFTER SCLR
 3639
 3640  011600  012737  177777  001160          MOV     #-1,$TMPO       ;SETUP TIMEOUT, ALL 1'S
 3641  011606  012765  100000  000000  64$:     MOV     #CCLR,RKCS1(R5)
 3642  011614  012765  000001  000026          MOV     #1,RKMR1(R5)    ;SELECT WORD 1
 3643  011622  004737  045534                  JSR     PC,GSTAT
 3644  011626  032737  001000  003362          BIT     #D.SPOK,HMR2    ;SEE IF SPEED OK GONE
 3645  011634  001404                          BEQ     65$             ;BR IF YES
 3646  011636  005337  001160                  DEC     $TMPO           ;ELSE TRY AGAIN IF TIME NOT UP
 3647  011642  001361                          BNE     64$
 3648  011644  104315                          ERROR   315             ;SPEED NOT DOWN BY TIMEOUT
 3649  011646                          65$:
 3650
 3651
 3652
 3653
 3654
 3655  011646                          PFSRT:                          ;ENTER HERE FOR POWER FAIL RESTART
 3656                                  .SBTTL STATIC & CYCLE UP TESTS
 3657
 3658                                  ;;*****************************************************************
 3659                                  ;*TEST 6        REFERENCE & CHECK ALL STATUS BYTES IN RKMR2 & RKMR3
 3660                                  ;*
 3661                                  ;*       CHECKS THE ABILITY TO REFERENCE ALL
 3662                                  ;*      DRIVE REGISTERS AND THAT THEY CONTAIN CORRECT STATUS.
 3663                                  ;*
 3664                                  ;;*****************************************************************
 3665  011646  000004                  TST6:   SCOPE
 3666  011650  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
 3667  011656  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
 3668
 3669  011662  004737  046106                  JSR     PC,SUBCLR
 3670  011666  104024                          ERROR   24              ;CERR AFTER SCLR
 3671
 3672  011670  004737  045534                  JSR     PC,GSTAT
 3673  011674  032737  000100  003362          BIT     #D.VV,HMR2
 3674  011702  001004                          BNE     4$              ;BR IF VV SET
 3675  011704  012737  000040  003424          MOV     #D.DRA,E.AO     ;LOAD EXPECTED VALUE FOR AO
 3676  011712  000403                          BR      5$
 3677
 3678  011714  012737  000140  003424  4$:     MOV     #<D.DRA!D.VV>,E.AO
```

```
 3679  011722  005037  003426          5$:     CLR     E.B0            ;EXPECTED MSG B0
 3680  011726  012737  000740  003430          MOV     #<D.HDHM!D.BRHM!D.DOOR!D.CART>,E.A1      ;EXPECTED MSG A1
 3681  011734  012737  000001  003432          MOV     #1,E.B1         ;EXPECTED MSG B1
 3682  011742  005037  003434                  CLR     E.A2            ;EXPECTED MSG A2
 3683  011746  012737  000002  003436          MOV     #2,E.B2         ;EXPECTED MSG B2
 3684  011754  012737  000003  003442          MOV     #3,E.B3         ;EXPECTED MSG B3
 3685
 3686  011762  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
 3687  011766  000007                          .WORD   T.A2!T.B2!T.B3          ;& MSGS SPECIFIED HERE
 3688  011770  104016                          ERROR   16              ;MSG A0 ERROR FOR DRIVE UNLOADED
 3689  011772  104017                          ERROR   17              ;MSG B0 ERROR
 3690  011774  104020                          ERROR   20              ;MSG A1 ERROR
 3691  011776  104021                          ERROR   21              ;MSG B1 ERROR
 3692
 3693  012000  005737  001362                  TST     CYLDIF          ;SEE IF MSG A2=0
 3694  012004  001401                          BEQ     64$             ;BR IF YES
 3695  012006  104022                          ERROR   22              ;MSG A2 NOT CLEARED FOR DRIVE UNLOADED
 3696  012010  005737  001364          64$:    TST     CYLADD          ;SEE IF MSG B2=0
 3697  012014  001401                          BEQ     65$             ;BR IF YES
 3698  012016  104023                          ERROR   23              ;MSG B2 NOT CLEARED FOR DRIVE UNLOADED
 3699  012020                          65$:
 3700  012020  023727  001432  000001          CMP     HEADA,#1        ;FOR HEAD 0, B3=1
 3701  012026  001401                          BEQ     TST7            ;;GO TO NXT TST IF YES
 3702  012030  104056                          ERROR   56              ;HEAD REG IN B3 NOT 0 IN UNLOAD
 3703
 3704
 3705
 3706                                  ;;*****************************************************************
 3707                                  ;*TEST 7        PRINT DRIVE SERIAL NUMBER
 3708                                  ;*
 3709                                  ;*      THIS TEST READS & PRINTS THE DRIVE SERIAL # FROM MSG A, WORD 11
 3710                                  ;*      IN BCD & IS PERFORMED ON THE 1ST PASS ONLY
 3711                                  ;*
 3712                                  ;;*****************************************************************
 3713  012032  000004                  TST7:   SCOPE
 3714  012034  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
 3715  012042  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
 3716
 3717  012046  005737  001216                  TST     $PASS
 3718  012052  001046                          BNE     TST10           ;;GO TO NEXT IF NOT FIRST PASS
 3719  012054  004737  046106                  JSR     PC,SUBCLR       ;DO SUBSYS CLEAR
 3720  012060  104024                          ERROR   24              ;CERR AFTER SCLR
 3721
 3722  012062  104401  056553                  TYPE    ,MSG16          ;DRIVE SERIAL NO.
 3723  012066  012765  000003  000026          MOV     #3,RKMR1(R5)    ;SELECT BYTE 3
 3724  012074  004737  045534                  JSR     PC,GSTAT        ;GET STATUS
 3725  012100  013701  003362                  MOV     HMR2,R1         ;GET SERIAL #
 3726  012104  012704  054260                  MOV     #$OCTVL,R4      ;GET ADDR CHAR BUFF
 3727  012110  010446                          MOV     R4,-(SP)        ;STORE ON STACK FOR $SUPRS
 3728  012112  012703  000003                  MOV     #3,R3           ;SETUP CHAR COOUNT
 3729  012116  006101                          ROL     R1              ;INITIALIZE BIT POSITIONS
 3730  012120  006101                          ROL     R1
 3731  012122  006101                  1$:     ROL     R1              ;GET NEXT 4 BITS
 3732  012124  006101                          ROL     R1
 3733  012126  006101                          ROL     R1
 3734  012130  006101                          ROL     R1
```

```
3735  012132  010100                          MOV     R1,R0           ;GET WORKING COPY
3736  012134  042700  177760                  BIC     #177760,R0      ;CLEAR A.  BUT LOW 4 BITS
3737  012140  052700  000060                  BIS     #60,R0          ;CONVERT TO ASCII DIGIT
3738  012144  110024                          MOVB    R0,(R4)+        ;PUT ASCII DIGIT INTO CHAR BUFF
3739  012146  005303                          DEC     R3
3740  012150  001364                          BNE     1$              ;BR IF ALL 3 CHARS NOT DONE
3741  012152  105014                          CLRB    (R4)            ;ELSE INSERT NULL TERMINATOR
3742  012154  004737  054526                  JSR     PC,$SUPRS       ;TYPE
3743  012160  104401  001205                  TYPE    ,$CRLF
3744  012164  104401  001205                  TYPE    ,$CRLF
3745
3746                                  ;;*****************************************************************
3747                                  ;*TEST 10       SET VV WITH PACK CMD
3748                                  ;*
3749                                  ;*      IF VV IS RESET, THE PACK CMD IS USED TO SET IT.
3750                                  ;*
3751                                  ;;*****************************************************************
3752  012170  000004                  TST10:  SCOPE
3753  012172  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
3754  012200  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
3755
3756  012204  005065  000026                  CLR     RKMR1(R5)       ;SELECT BYTE 0
3757  012210  004737  045534                  JSR     PC,GSTAT        ;GET STATUS
3758  012214  032737  000100  003362          BIT     #D.VV,HMR2
3759  012222  001024                          BNE     TST11           ;;GO TO NEXT TEST IF VV SET
3760
3761  012224  104415                          SCOP1
3762  012226  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
3763
3764  012232  004737  046106                  JSR     PC,SUBCLR
3765  012236  104024                          ERROR   24              ;CERR AFTER SCLR
3766
3767  012240  012765  000003  000000          MOV     #PACK,RKCS1(R5) ;CMD TO SET VV
3768  012246  013737  001414  003372          MOV     T10,TEMP1
3769  012254  004737  044176                  JSR     PC,FRDY         ;FIND RDY
3770  012260  104116                          ERROR   116             ;RDY NOT SET AFTER PACK CMD
3771
3772  012262  032737  000100  003362          BIT     #D.VV,HMR2
3773  012270  001001                          BNE     TST11           ;;GO TO NEXT TEST IF VV NOW SET
3774  012272  104027                          ERROR   27              ;PACK DID NOT SET V.V.
3775
3776                                  ;;*****************************************************************
3777                                  ;*TEST 11       RELEASE DRIVE
3778                                  ;*
3779                                  ;*      TESTS THE ABILITY TO RECOGNIZE THE RLS BIT AND NOT RAISE SACK
3780                                  ;*
3781                                  ;;*****************************************************************
3782  012274  000004                  TST11:  SCOPE
3783  012276  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
3784  012304  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
3785
3786  012310  004737  046106                  JSR     PC,SUBCLR       ;DO SUBSYS CLEAR & GET STATUS
3787  012314  104024                          ERROR   24              ;CONTR ERROR SET AFTER SCLR
3788  012316  032737  000400  003336          BIT     #UFE,HCS2
3789  012324  001401                          BEQ     1$
3790  012326  104003                          ERROR   3               ;UFE SET AFTER SCLR
```

```
3791
3792  012330                                  1$:
3793  012330  104415                                  SCOP1
3794  012332  012706  001100                          MOV     #STACK,SP       ;RESTORE STK PTR
3795
3796  012336  004737  046106                          JSR     PC,SUBCLR
3797  012342  104024                                  ERROR   24              ;CERR AFTER SCLR
3798
3799  012344  062765  000010  000010                  ADD     #RLS,RKCS2(R5)  ;ADD RELEASE BIT TO $UNIT
3800  012352  004737  045534                          JSR     PC,GSTAT        ;GET STATUS
3801
3802  012356  032737  100000  003334                  BIT     #CERR,HCS1      ;CHECK FOR CONTR ERROR
3803  012364  001401                                  BEQ     2$
3804  012366  104025                                  ERROR   25              ;RLS SET CERR
3805  012370  032737  000400  003336  2$:             BIT     #UFE,HCS2
3806  012376  001401                                  BEQ     TST12           ;;GO TO NEXT TEST IF SET
3807  012400  104026                                  ERROR   26              ;SACK SET AFTER RLS SENT
3808
3809                                          ;;**************************************************************
3810                                          ;*TEST 12       DRIVE TYPE TEST
3811                                          ;*
3812                                          ;*      THIS TEST COMPARES DRIVE TYPE IN MSG A AGAINST 'DDT' IN RKDS.
3813                                          ;*      WRONG CDT IN RKCS1 IS SENT & ERRORS ARE VERIFIED.
3814                                          ;*
3815                                          ;;**************************************************************
3816  012402  000004                          TST12:  SCOPE
3817  012404  012737  000001  001174                  MOV     #1,$TIMES       ;;DO 1 ITERATION
3818  012412  012706  001100                          MOV     #STACK,SP       ;RESTORE STK PTR
3819
3820  012416  004737  046106                          JSR     PC,SUBCLR       ;SUBSYS CLEAR & GET STATUS
3821  012422  104024                                  ERROR   24              ;CONT ERROR SET AFT SUBSYS CLEAR
3822  012424  032737  000400  003362                  BIT     #D.DDT,HMR2
3823  012432  001401                                  BEQ     2$
3824  012434  104030                                  ERROR   30              ;DR TYPE SET IN MR2
3825  012436  032737  000400  003346  2$:             BIT     #DDT,HDS
3826  012444  001401                                  BEQ     3$
3827  012446  104031                                  ERROR   31              ;DDT SET IN RKDS
3828  012450  032737  000040  003350  3$:             BIT     #DTYE,HER
3829  012456  001401                                  BEQ     4$
3830  012460  104032                                  ERROR   32              ;DTYE SET IN RKER
3831
3832  012462                                  4$:
3833  012462  104415                                  SCOP1
3834  012464  012706  001100                          MOV     #STACK,SP       ;RESTORE STK PTR
3835
3836  012470  004737  046106                          JSR     PC,SUBCLR
3837  012474  104024                                  ERROR   24              ;CERR AFTER SCLR
3838
3839  012476  012765  002001  000000                  MOV     #<CDT!SELDR/>,RKCS1(R5)  ;GET STATUS WITH CDT SET
3840  012504  013737  001414  003372                  MOV     T10,TEMP1
3841  012512  004737  044176                          JSR     PC,FRDY         ;FIND RDY
3842  012516  104117                                  ERROR   117             ;RDY NOT SET BY END OF SEL DRV CMD
3843  012520  032737  000400  003362                  BIT     #D.DDT,HMR2
3844  012526  001401                                  BEQ     5$
3845  012530  104030                                  ERROR   30              ;DR TYPE SET IN MR2
3846  012532  032737  000400  003346  5$:             BIT     #DDT,HDS
```

```
                                        BEQ     6$
                                        ERROR   31              ;DDT SET IN RKDS
                                        BIT     #DTYE.HER       ;DTYE=DDT(NOT)*CDT
                                        BNE     7$
                                        ERROR   33              ;DTYE NOT SET AFT WRITING CDT=1
                                7$:     BIT     #CERR.HCS1
                                        BNE     TST13           ;;GO TO NEXT TEST
                                        ERROR   34              ;CERR NOT SET AFT WRITING CDT=1

                        ;;**************************************************************
                        ;*TEST 13       C-D PARITY ERROR DETECTION
                        ;*
                        ;*      TESTS THE ABILITY OF THE DRIVE TO DETECT EVEN PARITY SENT BY
                        ;*      THE CONTROLLER BY SETTING 'PAT' ON RKMR1.
                        ;*      THE DRIVE SHOULD RESPOND WITH 'C-D PARITY ERROR'
                        ;*      THE DRIVE STILL SENDS ODD PARITY TO THE CONTROLLER WHICH IS NOW
                        ;*      CHECKING FOR EVEN PARITY THEREFORE THE CONTROLLER SHOULD DETECT
                        ;*      AN ERROR AND SET DCPAR.
                        ;*      THE ERROR CONDITION IS RESET WITH THE CLEAR CMD
                        ;*
                        ;;**************************************************************
                        TST13:  SCOPE
                                MOV     #1,$TIMES       ;;DO 1 ITERATION
                                MOV     #STACK,SP       ;RESTORE STK PTR

                                JSR     PC,SUBCLR       ;SUBSYS CLEAR & GET STATUS
                                ERROR   24              ;CONT ERROR AFTER SJBSYS CLR
                                BIT     #D.PAR,HMR3
                                BEQ     2$
                                ERROR   35              ;C-D PARITY ERROR SET IN MR3
                        2$:     BIT     #DCPAR,HCS1
                                BEQ     3$
                                ERROR   36              ;DCPAR SET IN CS1

                        3$:
                                SCOP1
                                MOV     #STACK,SP       ;RESTORE STK PTR

                                JSR     PC,SUBCLR
                                ERROR   24              ;CERR AFTER SCLR

                                MOV     #PAT,RKMR1(R5)  ;SELECT BYTE 0 & EVEN PARITY
                                JSR     PC,GSTAT        ;GET STATUS
                                BIT     #D.FLT,HMR3
                                BNE     4$
                                ERROR   37              ;FAULT NOT SET IN MR3
                        4$:     BIT     #D.PAR,HMR3
                                BNE     5$
                                ERROR   40              ;C-D PARITY ERROR NOT SET IN MR3
                        5$:     BIT     #DCPAR,HCS1
                                BNE     6$
                                ERROR   41              ;DCPAR NOT SET AFT WRITING PAT IN MR1
                        6$:     BIT     #CERR,HCS1
                                BNE     TST14           ;;GO TO NEXT TEST
                                ERROR   42              ;CERR NOT SET BY WRITING PAT IN MR1
```

```
                                        ;;*****************************************************************
                                        ;*TEST 14       VERIFY START SPINDLE CMD
                                        ;*
                                        ;*      THE PROGRAM CHECKS THE ENTIRE STARTUP SEQUENCE, IE:
                                        ;*      BRUSH CYCLE, HEADS HOME, FWD, REV ETC.
                                        ;*      BY VERIFYING ALL APPROPRIATE STATUS BITS FOR PROPER SEQUENCING.
                                        ;*      THE CYL ADDRESS & CYL DIFFERENCE REGS ARE CHECKED
                                        ;*      TO BE ZERO AT THE END OF THE SEQUENCE.
                                        ;*
                                        ;;*****************************************************************
012734  000004                    TST14:  SCOPE
012736  012737  000001  001174            MOV     #1,$TIMES       ;;DO 1 ITERATION
012744  012706  001100                    MOV     #STACK,SP       ;RESTORE STK PTR

012750  004737  046106                    JSR     PC,SUBCLR       ;SUBSYS CLEAR & GET STATUS
012754  104024                            ERROR   24              ;CERR AFTER SCLR

012756  012765  000011  000000            MOV     #SRTSPL,RKCS1(R5) ;START SPINDLE CMD
012764  012737  001414  003372            MOV     T10,TEMP1       ;SETUP TIMEOUT
012772  004737  044176                    JSR     PC,FRDY
012776  104121                            ERROR   121             ;RDY NOT SET AFTER START SPIN CMD

013000  004737  045534                    JSR     PC,GSTAT        ;WORD 0
013004  032737  010000  003362            BIT     #0.SPIN,HMR2
013012  001001                            BNE     13$
013014  104306                            ERROR   306             ;SPIN NOT SET AFTER START SPIN CMD

013016  012737  014360  001176  13$:      MOV     #25$,$ESCAPE
013024  004737  044460                    JSR     PC,TSTATN       ;TEST FOR ATTN
013030  000401                            BR      15$
013032  104316                            ERROR   316
013034  012737  010140  003424  15$:      MOV     #<0.SPIN!0.VV!0.DRA>,E.A0       ;LOAD IN EXPECTED VALUES
013042  005037  003426                    CLR     E.B0
013046  012737  000740  003430            MOV     #<0.CART!0.DOOR!0.HDHM!0.BRHM>,E.A1
013054  012737  000001  003432            MOV     #1,E.B1

013062  004737  044720                    JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
013066  000000                            .WORD   0!0!0           ;& MSGS SPECIFIED HERE
013070  104057                            ERROR   57              ;MSG A0 ERROR AFTER START SPIN CMD REC'D BY DRIVE
013072  104060                            ERROR   60              ;MSG B0 ERROR
013074  104061                            ERROR   61              ;MSG A1 ERROR
013076  104062                            ERROR   62              ;MSG B1 ERROR
013100  005737  003502                    TST     00TIM
013104  001135                            BNE     3$              ;BRANCH IF P OR L CLOCK PRESENT
013106  012737  014404  001176  1$:       MOV     #30$,$ESCAPE
013114  012765  100000  000000            MOV     #CCLR,RKCS1(R5)
013122  013737  001416  003374            MOV     T100,TEMP2      ;SETUP TIMEOUT
013130  004737  044512                    JSR     PC,FATT1        ;FIND ATTN
013134  104067                            ERROR   67              ;NO ATTN AFTER HEAD LOADING
013136                            2$:

013136  012737  050340  003424            MOV     #<0.DSC!0.SPIN!0.DRDY!0.VV!0.DRA>,E.A0  ;EXPECTED MSG A0
013144  005037  003426                    CLR     E.B0            ;EXPECTED MSG B0
013150  012737  001720  003430            MOV     #<0.SPOK!0.CART!0.DOOR!0.BRHM!0.SSP>,E.A1       ;EXPECTED A1
013156  012737  000001  003432            MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
013164  005037  003434                    CLR     E.A2            ;EXPECTED MSG A2
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3959  013170  012737  000002  003436          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
3960  013176  012737  000003  003442          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
3961
3962  013204  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
3963  013210  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
3964  013212  104063                          ERROR   63              ;MSG A0 ERROR AT END OF HEAD LOAD
3965  013214  104064                          ERROR   64              ;MSG B0 ERROR
3966  013216  104065                          ERROR   65              ;MSG A1 ERROR
3967  013220  104066                          ERROR   66              ;MSG B1 ERROR
3968
3969  013222  005737  001362                  TST     CYLDIF          ;SEE IF MSG A2=0
3970  013226  001401                          BEQ     64$             ;BR IF YES
3971  013230  104175                          ERROR   175             ;MSG A2 NOT CLEARED AT END OF HEAD LOAD
3972  013232  005737  001364          64$:    TST     CYLADD          ;SEE IF MSG B2=0
3973  013236  001401                          BEQ     65$             ;BR IF YES
3974  013240  104176                          ERROR   176             ;MSG B2 NOT CLEARED AT END OF HEAD LOAD
3975  013242                          65$:
3976
3977  013242  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
3978  013250  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
3979  013256  012765  000005  000000          MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
3980  013264  013737  001414  003372          MOV     T10,TEMP1
3981  013272  004737  044176                  JSR     PC,FRDY         ;FIND RDY
3982  013276  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
3983  013300  004737  044460                  JSR     PC,TSTATN       ;TEST FOR ATTN
3984  013304  000401                          BR      66$
3985  013306  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
3986  013310                          66$:
3987
3988  013310  012737  010340  003424          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
3989  013316  005037  003426                  CLR     E.B0            ;EXPECTED MSG B0
3990  013322  012737  001720  003430          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
3991  013330  012737  000001  003432          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
3992  013336  005037  003434                  CLR     E.A2            ;EXPECTED MSG A2
3993  013342  012737  000002  003436          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
3994  013350  012737  000003  003442          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
3995
3996  013356  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
3997  013362  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
3998  013364  104273                          ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
3999  013366  104265                          ERROR   265             ;MSG B0 ERROR
4000  013370  104274                          ERROR   274             ;MSG A1 ERROR
4001  013372  104266                          ERROR   266             ;MSG B1 ERROR
4002
4003  013374  000137  014140                  JMP     12$
4004
4005  013400  012765  100000  000000  3$:     MOV     #CCLR,RKCS1(R5)
4006  013406  013737  001370  001372          MOV     HZ,COUNT
4007  013414  012737  000074  001374          MOV     #60.,SEC
4008  013422  004737  047614                  JSR     PC,CLKON        ;TURN CLK INTR ON FOR 60 SEC MAX
4009  013426  012765  000001  000026          MOV     #1,RKMR1(R5)    ;SELECT WORD 1
4010  013434  004737  045534          4$:     JSR     PC,GSTAT
4011  013440  032737  002000  003362          BIT     #D.FWD,HMR2
4012  013446  001004                          BNE     5$
4013  013450  005737  001376                  TST     TIMUP           ;IS 60 SEC DELAY UP?
4014  013454  001767                          BEQ     4$              ;BRANCH IF NO & REPEAT
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4015  013456  104070                          ERROR   70              ;FWD NOT SET WITHIN 60 SEC FROM
4016                                                                  ;START SPINDLE CMD.
4017  013460  004737  047710          5$:     JSR     PC,CLKOF        ;TURN OFF CLOCK INTERRORUPT
4018  013464  012765  100000  000000        MOV     #CCLR,RKCS1(R5)
4019  013472  012737  011610  003372        MOV     #5000.,TEMP1
4020  013500  004737  044666                JSR     PC,DLY          ;WAIT APPROX 100MS FOR PIP
4021  013504  004737  044460                JSR     PC,TSTATN       ;TEST FOR ATTN
4022  013510  000401                        BR      16$
4023  013512  104317                        ERROR   317             ;UNEXP ATTN AFTER ST SPIN & FWD DETECTED
4024  013514  012737  030140  003424  16$:  MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
4025  013522  005037  003426                CLR     E.B0
4026  013526  012737  013700  003430        MOV     #<D.LOAD!D.FWD!D.SPOK!D.CART!D.DOOR!D.BRHM>,E.A1
4027  013534  012737  000001  003432        MOV     #1,E.B1
4028
4029  013542  004737  044720                JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
4030  013546  000000                        .WORD   0!0!0           ;& MSGS SPECIFIED HERE
4031  013550  104071                        ERROR   71              ;MSG A0 ERROR AFTER START SPIN & FWD DETECTED
4032  013552  104072                        ERROR   72              ;MSG B0 ERROR
4033  013554  104073                        ERROR   73              ;MSG A1 ERROR
4034  013556  104074                        ERROR   74              ;MSG B1 ERROR
4035
4036  013560  013737  001370  001372        MOV     HZ,COUNT
4037  013566  012737  000005  001374        MOV     #5,SEC
4038  013574  004737  047614                JSR     PC,CLKON        ;TURN CLK INTR ON FOR 5 SEC MAX
4039  013600  012765  000001  000026  6$:   MOV     #1,RKMR1(R5)    ;WORD 1
4040  013606  004737  045534                JSR     PC,GSTAT
4041  013612  032737  002000  003362        BIT     #D.FWD,HMR2
4042  013620  001404                        BEQ     7$
4043  013622  005737  001376                TST     TIMUP
4044  013626  001764                        BEQ     6$
4045  013630  104075                        ERROR   75              ;FWD NOT CLEARED WITHIN 5 SEC OF MOTION
4046                                                                  ;FROM START SPINDLE CMD.
4047  013632  004737  047710          7$:     JSR     PC,CLKOF        ;TURN OFF CLK INTERRORUPT
4048  013636  004737  044460                JSR     PC,TSTATN       ;TEST FOR ATTN
4049  013642  000401                        BR      17$
4050  013644  104320                        ERROR   320             ;UNEXP ATTN AFTER INNER LIM DETECT
4051  013646  012737  030140  003424  17$:  MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
4052  013654  005037  003426                CLR     E.B0
4053  013660  012737  025720  003430        MOV     #<D.RTZ!D.REV!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
4054  013666  012737  000001  003432        MOV     #1,E.B1
4055
4056  013674  004737  044720                JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
4057  013700  000000                        .WORD   0!0!0           ;& MSGS SPECIFIED HERE
4058  013702  104076                        ERROR   76              ;MSG A0 ERROR AT INNER LIMIT DETECT
4059  013704  104077                        ERROR   77              ;MSG B0 ERROR
4060  013706  104100                        ERROR   100             ;MSG A1 ERROR
4061  013710  104101                        ERROR   101             ;MSG B1 ERROR
4062
4063  013712  013737  001370  001372        MOV     HZ,COUNT
4064  013720  012737  000004  001374        MOV     #4,SEC
4065  013726  004737  047614                JSR     PC,CLKON        ;TURN CLK INTR ON FOR 4 SEC MAX
4066  013732  012765  000001  000026  8$:   MOV     #1,RKMR1(R5)    ;WORD 1
4067  013740  004737  045534                JSR     PC,GSTAT
4068  013744  032737  002000  003362        BIT     #D.FWD,HMR2
4069  013752  001004                        BNE     9$
4070  013754  005737  001376                TST     TIMUP
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 4071  013760  001764                        BEQ     8$
 4072  013762  104102                        ERROR   102             ;FWD NOT DETECTED WITHIN 4 SEC IN RTZ PORTION OF
 4073                                                                ;START SPINDLE CMD.
 4074  013764  004737  047710          9$:   JSR     PC,CLKOF        ;TURN CLOCK INTR OFF.
 4075  013770  004737  044460                JSR     PC,TSTATN       ;TEST FOR ATTN
 4076  013774  000401                        BR      18$
 4077  013776  104321                        ERROR   321             ;UNEXP ATTN AFTER OUTER LIM TO CYL 0
 4078  014000  012737  030140  003424  18$:   MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
 4079  014006  005037  003426                CLR     E.B0
 4080  014012  012737  023720  003430        MOV     #<D.RTZ!D.FWD!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
 4081  014020  012737  000001  003432        MOV     #1,E.B1
 4082
 4083  014026  004737  044720                JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
 4084  014032  000000                        .WORD   0!0!0           ;& MSGS SPECIFIED HERE
 4085  014034  104103                        ERROR   103             ;MSG A0 ERROR FROM OUT LIM TO CYL 0 DURING LOAD
 4086  014036  104104                        ERROR   104             ;MSG B0 ERROR
 4087  014040  104105                        ERROR   105             ;MSG A1 ERROR
 4088  014042  104106                        ERROR   106             ;MSG B1 ERROR
 4089  014044  013737  001370  001372        MOV     HZ,COUNT
 4090  014052  012737  000001  001374        MOV     #1,SEC
 4091  014060  004737  047614                JSR     PC,CLKON        ;TURN CLK INTR ON FOR 1 SEC MAX
 4092  014064  005065  000026          10$:  CLR     RKMR1(R5)       ;WORD 0
 4093  014070  004737  045534                JSR     PC,GSTAT
 4094  014074  032737  000200  003362        BIT     #D.DRDY,HMR2    ;SEE IF DRIVE READY
 4095  014102  001004                        BNE     11$
 4096  014104  005737  001376                TST     TIMUP
 4097  014110  001765                        BEQ     10$
 4098  014112  104107                        ERROR   107             ;DRIVE READY NOT SET WITHIN 1 SEC FROM
 4099                                                                ;FWD IN RTZ PORTION OF START SPIN CMD
 4100  014114  004737  047710          11$:  JSR     PC,CLKOF        ;TURN CLOCKS OFF
 4101  014120  004737  044460                JSR     PC,TSTATN       ;TEST ATTN
 4102  014124  104067                        ERROR   67              ;NO ATTN AFTER START SPIN CMD
 4103  014126  012737  014404  001176        MOV     #30$,$ESCAPE
 4104  014134  000137  013136                JMP     2$              ;CHECK RKMR 2 & 3 WORDS 0 & 1
 4105
 4106  014140  005037  001176          12$:  CLR     $ESCAPE
 4107  014144  012765  100000  000000        MOV     #CCLR,RKCS1(R5)
 4108  014152  005065  000026                CLR     RKMR1(R5)
 4109  014156  004737  045534                JSR     PC,GSTAT
 4110  014162  032737  010000  003362        BIT     #D.SPIN,HMR2
 4111  014170  001003                        BNE     14$
 4112  014172  104306                        ERROR   306             ;SPIN NOT SET AFTER ST. SPIN CMD
 4113  014174  000137  042470                JMP     $EOP            ;ABORT DRIVE
 4114  014200  005037  003316          14$:  CLR     UNLD            ;USED FOR VALID HALT
 4115  014204  004737  050036                JSR     PC,SWTST        ;SEE IF SW 14 OR 8 IS SET
 4116  014210  000507                        BR      TST15           ;;GO TO NEXT TEST
 4117                                                                ;RETURN HERE IF SW 14 IS SET OR
 4118                                                                ;SW 8 WITH SWR <7:0> APPLY
 4119  014212  005237  003316          20$:  INC     UNLD
 4120
 4121  014216  004737  046106                JSR     PC,SUBCLR
 4122  014222  104024                        ERROR   24              ;CERR AFTER SCLR
 4123
 4124  014224  012765  000007  000000        MOV     #UNLOAD,RKCS1(R5)       ;UNLOAD CMD
 4125  014232  013737  001414  003372        MOV     T10,TEMP1
 4126  014240  004737  044176                JSR     PC,FRDY         ;FIND RDY
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4127  014244  104011                          ERROR   11              ;RDY NOT SET AFTER UNLOAD CMD.
4128  014246  004737  044460                  JSR     PC,TSTATN
4129  014252  104012                          ERROR   12              ;NO ATTN AFTER UNLOAD CMD
4130
4131  014254  004737  046106                  JSR     PC,SUBCLR
4132  014260  104024                          ERROR   24              ;CERR AFTER SCLR
4133
4134  014262  012737  177777  001160          MOV     #-1,$TMPO       ;SETUP TIMEOUT, ALL 1'S
4135  014270  012765  100000  000000  67$:    MOV     #CCLR,RKCS1(R5)
4136  014276  012765  000001  000026          MOV     #1,RKMR1(R5)    ;SELECT WORD 1
4137  014304  004737  045534                  JSR     PC,GSTAT
4138  014310  032737  001000  003362          BIT     #D.SPOK,HMR2    ;SEE IF SPEED OK GONE
4139  014316  001404                          BEQ     68$             ;BR IF YES
4140  014320  005337  001160                  DEC     $TMPO           ;ELSE TRY AGAIN IF TIME NOT UP
4141  014324  001361                          BNE     67$
4142  014326  104315                          ERROR   315             ;SPEED NOT DOWN BY TIMEOUT
4143  014330                          68$:
4144
4145  014330  004737  046106                  JSR     PC,SUBCLR
4146  014334  104024                          ERROR   24              ;CERR AFTER SCLR
4147
4148  014336  005037  001176                  CLR     $ESCAPE
4149  014342  005737  001410                  TST     LPFLG
4150  014346  001402                          BEQ     69$
4151  014350  000177  164534                  JMP     @$LPERR         ;SW 9 WAS SET.
4152  014354  000177  164526          69$:    JMP     @$LPADR         ;SW 14 OR 8 WAS SET
4153
4154
4155
4156  014360  004737  047710          25$:    JSR     PC,CLKOF
4157  014364  005237  001410                  INC     LPFLG
4158  014370  032777  001000  164542          BIT     #SW9,@SWR       ;LOOP ON ERROR?
4159  014376  001305                          BNE     20$             ;YES, RECONDITION DRIVE
4160  014400  000137  013106                  JMP     1$              ;RETURN TO MAINLINE
4161  014404  004737  047710          30$:    JSR     PC,CLKOF
4162  014410  005237  001410                  INC     LPFLG
4163  014414  032777  001000  164516          BIT     #SW9,@SWR       ;LOOP ON ERROR?
4164  014422  001273                          BNE     20$             ;YES, RECONDITION DRIVE
4165  014424  000137  014140                  JMP     12$             ;RETURN TO MAINLINE
4166                                  .SBTTL SEEK/READ HEADER/WRITE HEADER TESTS
4167
4168                                  ;;*****************************************************************
4169                                  ;*TEST 15       STATIC CYL DIFF AND CYL ADDR REG TEST; PART 1
4170                                  ;*
4171                                  ;*      THIS TEST CHECKS EACH BIT OF THE CYL DIFFERENCE
4172                                  ;*      AND CYL ADDRESS REGISTERS BY PERFORMING SEEKS TO ALL
4173                                  ;*      MAJOR CYLS (0,1,2,4,8,16,32,64,128,256) WITH EVEN PARITY SET.
4174                                  ;*      THIS FREEZES THE INFORMATION IN THE ABOVE REGISTERS & ALLOWS FOR CHECKING.
4175                                  ;*      THIS TEST VERIFIES C-D PARITY ERROR BIT SET, THAT HEADS DID
4176                                  ;*      NOT MOVE & ALL OTHER APPLICABLE STATUS BITS & REGS.
4177                                  ;*
4178                                  ;;*****************************************************************
4179  014430  000004                  T$T15:  SCOPE
4180  014432  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
4181  014440  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
4182
```

```
 4183  014444  005000                          CLR     R0              ;CYL # REGISTER
 4184  014446  012737  100000  003402          MOV     #BIT15,TEMP5
 4185
 4186  014454                          1$:
 4187  014454  104415                          SCOP1
 4188  014456  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
 4189
 4190  014462  004737  046106                  JSR     PC,SUBCLR
 4191  014466  104024                          ERROR   24              ;CERR AFTER SCLR
 4192
 4193
 4194  014470  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
 4195  014476  013765  001222  000010          MOV     $UNIT,RKCS2(R5)
 4196  014504  012765  000013  000000          MOV     #RECAL,RKCS1(R5)        ;RECAL CMD
 4197                                                                  ;RESET CYL DIFF/OFFSET & CYL ADDR REG
 4198                                                                  ;IN RKMR2 & RKMR3 RESP.
 4199  014512  013737  001414  003372          MOV     T10,TEMP1
 4200  014520  004737  044176                  JSR     PC,FRDY         ;FIND RDY
 4201  014524  104124                          ERROR   124             ;RDY NOT SET AFTER RECAL CMD
 4202
 4203  014526  012765  000001  000026          MOV     #1,RKMR1(R5)    ;SELECT WORD 1
 4204  014534  004737  045534                  JSR     PC,GSTAT
 4205  014540  032737  020000  003362          BIT     #D.RTZ,HMR2
 4206  014546  001001                          BNE     64$
 4207  014550  104244                          ERROR   244             ;RTZ NOT SET DURING RECAL CMD
 4208  014552  013737  001412  003374  64$:    MOV     T1,TEMP2        ;SETUP TIMEOUT
 4209  014560  004737  044512                  JSR     PC,FATT1        ;FIND ATTN
 4210  014564  104055                          ERROR   55              ;NO ATTN AFTER RECAL CMD
 4211
 4212  014566  012737  050340  003424          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
 4213  014574  005037  003426                  CLR     E.B0            ;EXPECTED MSG B0
 4214  014600  012737  001720  003430          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
 4215  014606  012737  000001  003432          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
 4216  014614  005037  003434                  CLR     E.A2            ;EXPECTED MSG A2
 4217  014620  012737  000002  003436          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
 4218  014626  012737  000003  003442          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
 4219
 4220  014634  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
 4221  014640  000007                          .WORD   T.A2!T.B2!T.B3          ;& MSGS SPECIFIED HERE
 4222  014642  104221                          ERROR   221             ;MSG A0 ERROR AFTER RECAL CMD
 4223  014644  104275                          ERROR   275             ;MSG B0 ERROR
 4224  014646  104222                          ERROR   222             ;MSG A1 ERROR
 4225  014650  104276                          ERROR   276             ;MSG B1 ERROR
 4226
 4227  014652  005737  001362                  TST     CYLDIF          ;SEE IF MSG A2=0
 4228  014656  001401                          BEQ     65$             ;BR IF YES
 4229  014660  104047                          ERROR   47              ;MSG A2 NOT CLEARED AFTER RECAL CMD
 4230  014662  005737  001364          65$:    TST     CYLADD          ;SEE IF MSG B2=0
 4231  014666  001401                          BEQ     66$             ;BR IF YES
 4232  014670  104050                          ERROR   50              ;MSG B2 NOT CLEARED AFTER RECAL CMD
 4233  014672                          66$:
 4234
 4235  014672  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
 4236  014700  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
 4237  014706  012765  000005  000000          MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
 4238  014714  013737  001414  003372          MOV     T10,TEMP1
```

```
 4239  014722  004737  044176                JSR     PC,FRDY          ;FIND RDY
 4240  014726  104151                        ERROR   151              ;NO RDY AFTER DRIVE CLEAR CMD
 4241  014730  004737  044460                JSR     PC,TSTATN        ;TEST FOR ATTN
 4242  014734  000401                        BR      67$
 4243  014736  104154                        ERROR   154              ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
 4244  014740                          67$:
 4245
 4246  014740  012737  010340  003424        MOV     #<D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
 4247  014746  005037  003426                CLR     E.B0             ;EXPECTED MSG B0
 4248  014752  012737  001720  003430        MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1      ;EXPECTED A1
 4249  014760  012737  000001  003432        MOV     #1,E.B1          ;MSG ID FOR EXPECTED MSG B1
 4250  014766  005037  003434                CLR     E.A2             ;EXPECTED MSG A2
 4251  014772  012737  000002  003436        MOV     #2,E.B2          ;MSG ID FOR EXPECTED MSG B2
 4252  015000  012737  000003  003442        MOV     #3,E.B3          ;MSG ID FOR EXPECTED MSG B3
 4253
 4254  015006  004737  044720                JSR     PC,CHKMSG        ;CHECK MSGS A0,B0,A1,B1
 4255  015012  000003                        .WORD   T.A2!T.B2!0              ;& MSGS SPECIFIED HERE
 4256  015014  104273                        ERROR   273              ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
 4257  015016  104265                        ERROR   265              ;MSG B0 ERROR
 4258  015020  104274                        ERROR   274              ;MSG A1 ERROR
 4259  015022  104266                        ERROR   266              ;MSG B1 ERROR
 4260
 4261
 4262  015024  104415                        SCOP1
 4263  015026  012706  001100                MOV     #STACK,SP        ;RESTORE STK PTR
 4264
 4265  015032  004737  046106                JSR     PC,SUBCLR
 4266  015036  104024                        ERROR   24               ;CERR AFTER SCLR
 4267
 4268  015040  005237  001462                INC     BYPCERR          ;DO NOT TEST CERR IN GSTAT1
 4269  015044  012765  000020  000026        MOV     #PAT,RKMR1(R5)   ;EVEN PARITY
 4270  015052  010065  000020                MOV     R0,RKDC(R5)      ;CYL ADDR
 4271  015056  012765  000017  000000        MOV     #SEEK,RKCS1(R5)  ;SEEK CMD.
 4272  015064  013737  001414  003372        MOV     T10,TEMP1
 4273  015072  004737  044176                JSR     PC,FRDY          ;FIND RDY
 4274  015076  104122                        ERROR   122              ;NO RDY FROM SEEK WITH BAD PARITY
 4275  015100  004737  044460                JSR     PC,TSTATN        ;TEST FOR ATTN
 4276  015104  104125                        ERROR   125              ;NO ATTN FROM SEEK & BAD PARITY
 4277  015106  012737  050340  003424        MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED A0
 4278  015114  012737  001200  003426        MOV     #<D.FLT!D.PAR>,E.B0
 4279  015122  012737  001720  003430        MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
 4280  015130  012737  000001  003432        MOV     #1,E.B1
 4281  015136  010037  003434                MOV     R0,E.A2
 4282  015142  010037  003436                MOV     R0,E.B2
 4283  015146  052737  000002  003436        BIS     #2,E.B2          ;ADD MSG ID
 4284
 4285  015154  004737  044720                JSR     PC,CHKMSG        ;CHECK MSGS A0,B0,A1,B1
 4286  015160  000003                        .WORD   T.A2!T.B2!0              ;& MSGS SPECIFIED HERE
 4287  015162  104110                        ERROR   110              ;MSG A0 ERROR AFTER SEEK WITH BAD PARITY
 4288  015164  104111                        ERROR   111              ;MSG B0 ERROR
 4289  015166  104146                        ERROR   146              ;MSG A1 ERROR
 4290  015170  104147                        ERROR   147              ;MSG B1 ERROR
 4291
 4292  015172  020037  001364                CMP     R0,CYLADD
 4293  015176  001401                        BEQ     2$
 4294  015200  104043                        ERROR   43               ;CYL ADDR IN B2 NOT=RKDC
```

```
                                                                                
015202  020037  001362          2$:     CMP     R0,CYLDIF
015206  001401                          BEQ     3$
015210  104044                          ERROR   44              ;CYL DIFF IN A2 NOT=RKDC
                                                                                
015212  005037  001462          3$:     CLR     BYPCERR         ;ALLOW CHECKING FOR ANY CERR IN GSTAT1
015216  006137  003402                  ROL     TEMP5           ;SET CARRY ONLY ONCE
015222  006100                          ROL     R0              ;SELECT NEXT MAJOR CYL
015224  020027  001000                  CMP     R0,#1000        ;ALL MAJOR CYL DONE?
015230  001001                          BNE     4$              ;BRANCH IF NO
015232  000402                          BR      TST16           ;;GO TO  NEXT TST
015234  000137  014454          4$:     JMP     1$
                                                                                
                                        ;;**************************************************************
                                        ;*TEST 16       STATIC CYL DIFF & CYL ADDR REG TEST-PART 2
                                        ;*
                                        ;*      THIS TEST CHECKS THE ABILITY OF THE DRIVE TO PROPERLY SET THE CYL
                                        ;*      DIFF. & CYL ADDR REGS FOR ALL COMBINATIONS BY SEEKING TO
                                        ;*      ALL CYLS FROM EVERY OTHER CYL. (N SQUARE SEEKS).
                                        ;*      IT IS PERFORMED IN THE SAME MANNER AS THE ABOVE TEST.
                                        ;*
                                        ;;**************************************************************
015240  000004                  TST16:  SCOPE
015242  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
015250  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
                                                                                
015254  005737  001340                  TST     BYPT16
015260  001404                          BEQ     13$
015262  104401  056274                  TYPE    ,MSG9           ;BYPASSING TEST 16
015266  000137  016530                  JMP     12$
                                                                                
015272  104401  056236          13$:    TYPE    ,MSG8           ;PLEASE WAIT, LONG TEST
                                                                                
015276  005037  001350                  CLR     FRCYL           ;FROM CYL
015302  005037  001352                  CLR     TOCYL           ;TO CYL
015306  005037  001354                  CLR     CCYL            ;CURRENT CYL
015312  005037  001356                  CLR     PCYL            ;PREV CYL
                                                                                
015316  104415                  SCOP1
015320  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
                                                                                
015324  004737  046106                  JSR     PC,SLBCLR
015330  104024                          ERROR   24              ;CERR AFTER SCLR
                                                                                
                                                                                
015332  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
015340  013765  001222  000010          MOV     $UNIT,RKCS2(R5)
015346  012765  000013  000000          MOV     #RECAL,RKCS1(R5)        ;RECAL CMD
                                                                        ;RESET CYL DIFF/OFFSET & CYL ADDR REG
                                                                        ;IN RKMR2 & RKMR3 RESP.
015354  013737  001414  003372          MOV     T10,TEMP1
015362  004737  044176                  JSR     PC,FRDY         ;FIND RDY
015366  104124                          ERROR   124             ;RDY NOT SET AFTER RECAL CMD
                                                                                
015370  012765  000001  000026          MOV     #1,RKMR1(R5)    ;SELECT WORD 1
015376  004737  045534                  JSR     PC,GSTAT
```

```
 4351  015402  032737  020000  003362          BIT     #D.RTZ,HMR2
 4352  015410  001001                          BNE     64$
 4353  015412  104244                          ERROR   244             ;RTZ NOT SET DURING RECAL CMD
 4354  015414  013737  001412  003374  64$:    MOV     T1,TEMP2        ;SETUP TIMEOUT
 4355  015422  004737  044512                  JSR     PC,FATT1        ;FIND ATTN
 4356  015426  104055                          ERROR   55              ;NO ATTN AFTER RECAL CMD
 4357
 4358  015430  012737  050340  003424          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
 4359  015436  005037  003426                  CLR     E.B0            ;EXPECTED MSG B0
 4360  015442  012737  001720  003430          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
 4361  015450  012737  000001  003432          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
 4362  015456  005037  003434                  CLR     E.A2            ;EXPECTED MSG A2
 4363  015462  012737  000002  003436          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
 4364  015470  012737  000003  003442          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
 4365
 4366  015476  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
 4367  015502  000007                          .WORD   T.A2!T.B2!T.B3          ;& MSGS SPECIFIED HERE
 4368  015504  104221                          ERROR   221             ;MSG A0 ERROR AFTER RECAL CMD
 4369  015506  104275                          ERROR   275             ;MSG B0 ERROR
 4370  015510  104222                          ERROR   222             ;MSG A1 ERROR
 4371  015512  104276                          ERROR   276             ;MSG B1 ERROR
 4372
 4373  015514  005737  001362                  TST     CYLDIF          ;SEE IF MSG A2=0
 4374  015520  001401                          BEQ     65$             ;BR IF YES
 4375  015522  104047                          ERROR   47              ;MSG A2 NOT CLEARED AFTER RECAL CMD
 4376  015524  005737  001364          65$:    TST     CYLADD          ;SEE IF MSG B2=0
 4377  015530  001401                          BEQ     66$             ;BR IF YES
 4378  015532  104050                          ERROR   50              ;MSG B2 NOT CLEARED AFTER RECAL CMD
 4379  015534                          66$:
 4380
 4381  015534  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
 4382  015542  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
 4383  015550  012765  000005  000000          MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
 4384  015556  013737  001414  003372          MOV     T10,TEMP1
 4385  015564  004737  044176                  JSR     PC,FRDY         ;FIND RDY
 4386  015570  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
 4387  015572  004737  044460                  JSR     PC,TSTATN       ;TEST FOR ATTN
 4388  015576  000401                          BR      67$
 4389  015600  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
 4390  015602                          67$:
 4391
 4392  015602  012737  010340  003424          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
 4393  015610  005037  003426                  CLR     E.B0            ;EXPECTED MSG B0
 4394  015614  012737  001720  003430          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
 4395  015622  012737  000001  003432          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
 4396  015630  005037  003434                  CLR     E.A2            ;EXPECTED MSG A2
 4397  015634  012737  000002  003436          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
 4398  015642  012737  000003  003442          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
 4399
 4400  015650  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
 4401  015654  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
 4402  015656  104273                          ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
 4403  015660  104265                          ERROR   265             ;MSG B0 ERROR
 4404  015662  104274                          ERROR   274             ;MSG A1 ERROR
 4405  015664  104266                          ERROR   266             ;MSG B1 ERROR
 4406
```

```
                                                SCOP1
015666  104415                                  
015670  012706  001100                          MOV     #STACK,SP       ;RESTORE STK PTR
                                                
015674  004737  046106                          JSR     PC,SUBCLR
015700  104024                                  ERROR   24              ;CERR AFTER SCLR
                                                
                                                
015702  012765  000020  000026  1$:     MOV     #PAT,RKMR1(R5)  ;EVEN PARITY
015710  013765  001352  000020                  MOV     TOCYL,RKDC(R5)  ;SET TO CYL ADDR
015716  013737  001352  001354                  MOV     TOCYL,CCYL      ;CURRENT CYL
015724  013737  001354  003376                  MOV     CCYL,TEMP3
015732  013737  001356  003400                  MOV     PCYL,TEMP4      ;PREV CYL
015740  163737  003376  003400                  SUB     TEMP3,TEMP4
015746  100002                                  BPL     2$              ;BR IF TEMP4 IS POS
015750  005437  003400                          NEG     TEMP4
015754  013737  003400  001360  2$:     MOV     TEMP4,CALDIF
015762  013737  001354  001356                  MOV     CCYL,PCYL
015770  012765  000017  000000                  MOV     #SEEK,RKCS1(R5) ;SEEK CMD.
015776  013737  001414  003372                  MOV     T10,TEMP1
016004  004737  044176                          JSR     PC,FRDY         ;FIND RDY
016010  104122                                  ERROR   122             ;NO RDY AFTER SEEK WITH BAD PARITY
016012  004737  044460                          JSR     PC,TSTATN       ;TEST FOR ATTN
016016  104125                                  ERROR   125             ;NO ATTN FROM SEEK & BAD PARITY
016020  012765  100000  000000                  MOV     #CCLR,RKCS1(R5) ;CLEAR ERROR
016026  013765  001352  000020                  MOV     TOCYL,RKDC(R5)  ;RESTOR RKDC AFT CCLR
016034  004737  046476                          JSR     PC,RDCYLA       ;READ CYL ADDR
016040  023737  001352  001364                  CMP     TOCYL,CYLADD    ;SEE IF TO CYL ECHOED OK
016046  001401                                  BEQ     3$
016050  104045                                  ERROR   45              ;MR3 NOT=RKDC
                                                
016052  004737  046412          3$:     JSR     PC,RDCYLD       ;READ CYL DIFF
016056  023737  001360  001362                  CMP     CALDIF,CYLDIF   ;SEE IF CYL DIFF CORRECT
016064  001401                                  BEQ     4$
016066  104046                                  ERROR   46              ;CYL DIFF IN RKMR2 INCORRECT
                                                
016070                          4$:
                                                
016070  012765  100000  000000                  MOV     #CCLR,RKCS1(R5)
016076  013765  001222  000010                  MOV     $UNIT,RKCS2(R5) ;DRIVE#
016104  012765  000005  000000                  MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
016112  013737  001414  003372                  MOV     T10,TEMP1
016120  004737  044176                          JSR     PC,FRDY         ;FIND RDY
016124  104151                                  ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
016126  004737  044460                          JSR     PC,TSTATN       ;TEST FOR ATTN
016132  000401                                  BR      68$
016134  104154                                  ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
016136                          68$:
                                                
                                                
016136  104415                                  SCOP1
016140  012706  001100                          MOV     #STACK,SP       ;RESTORE STK PTR
                                                
016144  004737  046106                          JSR     PC,SUBCLR
016150  104024                                  ERROR   24              ;CERR AFTER SCLR
                                                
```

```
 4463  016152  012765  000020  000026          MOV     #PAT,RKMR1(R5)  ;EVEN PARITY
 4464  016160  013765  001350  000020          MOV     FRCYL,RKDC(R5)  ;SET RETURN CYL ADDR
 4465  016166  013737  001350  001354          MOV     FRCYL,CCYL
 4466  016174  013737  001354  003376          MOV     CCYL,TEMP3
 4467  016202  013737  001356  003400          MOV     PCYL,TEMP4
 4468  016210  163737  003376  003400          SUB     TEMP3,TEMP4
 4469  016216  100002                          BPL     5$              ;BR IF TEMP4 IS POS
 4470  016220  005437  003400                  NEG     TEMP4
 4471  016224  013737  003400  001360  5$:     MOV     TEMP4,CALDIF
 4472  016232  013737  001354  001356          MOV     CCYL,PCYL
 4473  016240  012765  000017  000000          MOV     #SEEK,RKCS1(R5) ;SEEK CMD
 4474  016246  013737  001414  003372          MOV     T10,TEMP1
 4475  016254  004737  044176                  JSR     PC,FRDY         ;FIND RDY
 4476  016260  104122                          ERROR   122             ;NO RDY AFTER SEEK WITH BAD PARITY
 4477  016262  004737  044460                  JSR     PC,TSTATN       ;TEST FOR ATTN
 4478  016266  104125                          ERROR   125             ;NO ATTN FROM SEEK & BAD PARITY
 4479  016270  012765  100000  000000          MOV     #CCLR,RKCS1(R5) ;CLEAR ERROR
 4480  016276  013765  001350  000020          MOV     FRCYL,RKDC(R5)  ;RESTOR RKDC AFT CCLR
 4481  016304  004737  046476                  JSR     PC,RDCYLA       ;READ CYL ADDR
 4482  016310  023737  001350  001364          CMP     FRCYL,CYLADD    ;SEE IF RETURN CYL ECHOED OK
 4483  016316  001401                          BEQ     6$
 4484  016320  104241                          ERROR   241             ;MR3 NOT=RKDC
 4485
 4486  016322  023737  001352  001350  6$:     CMP     TOCYL,FRCYL     ;SEE IF TO=FROM
 4487  016330  001022                          BNE     10$             ;DO NORMAL TEST IF NO
 4488  016332  005737  001352                  TST     TOCYL           ;SEE IF=0
 4489  016336  001007                          BNE     9$
 4490  016340  004737  046412                  JSR     PC,RDCYLD       ;CYL DIFF S/B 0 ON CYL 0
 4491  016344  005737  001362                  TST     CYLDIF
 4492  016350  001421                          BEQ     7$
 4493  016352  104242                          ERROR   242             ;CYL DIFF IN RKMR2 INCORRECT
 4494  016354  000417                          BR      7$
 4495
 4496  016356  004737  046412          9$:     JSR     PC,RDCYLD       ;CYL DIFF/OFFSET SHOULD NOT
 4497  016362  023727  001362  000001          CMP     CYLDIF,#1       ;CHANGE IN SEEK TO SELF
 4498  016370  001411                          BEQ     7$              ;SHOULD = 1 IN THIS TEST
 4499  016372  104263                          ERROR   263             ;CYL DIFF IN RKMR2 DID NOT REMAIN = 0
 4500  016374  000407                          BR      7$
 4501  016376  004737  046412          10$:    JSR     PC,RDCYLD       ;READ CYL DIFF
 4502  016402  023737  001360  001362          CMP     CALDIF,CYLDIF   ;SEE IF CYL DIFF Ok
 4503  016410  001401                          BEQ     7$
 4504  016412  104242                          ERROR   242             ;CYL DIFF IN RKMR2 INCORRECT
 4505
 4506  016414                          7$:
 4507
 4508  016414  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
 4509  016422  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
 4510  016430  012765  000005  000000          MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
 4511  016436  013737  001414  003372          MOV     T10,TEMP1
 4512  016444  004737  044176                  JSR     PC,FRDY         ;FIND RDY
 4513  016450  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
 4514  016452  004737  044460                  JSR     PC,TSTATN       ;TEST FOR ATTN
 4515  016456  000401                          BR      69$
 4516  016460  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
 4517  016462                          69$:
 4518
```

```
                                                                                
                                                                                
016462  005237  001352                INC     TOCYL
016466  023727  001352  000633        CMP     TOCYL,#411.     ;SEE IF SCANNED ALL CYLS
016474  001402                        BEQ     8$              ;BR IF YES
016476  000137  015702                JMP     1$              ;ELSE REPEAT
                                                                                
016502  005237  001350        8$:     INC     FRCYL
016506  023727  001350  000633        CMP     FRCYL,#411.     ;SEE IF ALL DONE
016514  001405                        BEQ     TST17           ;;GO TO NEXT TST
016516  013737  001350  001352        MOV     FRCYL,TOCYL     ;FRCYL ALWAYS = OR > TOCYL
016524  000137  015702                JMP     1$              ;ELSE REPEAT
016530                          12$:
                                                                                
                                                                                
                                ;;*****************************************************
                                ;*TEST 17       HEAD REGISTER TEST
                                ;*
                                ;*      THIS TEST CHECKS THE ABILITY TO SELECT ALL HEADS (0,1,2)
                                ;*      VIA RKDA & READING BACK FROM MSG B3 BY THE SELECT DRIVE CMD.
                                ;*      HEAD 3 IS CHECKED TO PRODUCE INV. ADDR.
                                ;*
                                ;*      SINCE CHANGING HEAD ADDRESSES ARE TIED TO SEEK CMDS,
                                ;*      SELECTING HEAD 3 MUST RESULT IN A SEEK INCOMPLETE ALONG WITH
                                ;*      ILLEGAL ADDRESS. IF NOT,THIS MEANS THAT CHANGING HEAD ADDRESSES
                                ;*      ARE NOT TIED TO SEEK CMDS
                                ;*
                                ;;*****************************************************
016530  000004                TST17:  SCOPE
016532  012737  000001  001174        MOV     #1,$TIMES       ;;DO 1 ITERATION
016540  012706  001100                MOV     #STACK,SP       ;RESTORE STK PTR
                                                                                
016544  005000                        CLR     R0              ;HEAD #
016546                          1$:
016546  104415                        SCOP1
016550  012706  001100                MOV     #STACK,SP       ;RESTORE STK PTR
                                                                                
016554  004737  046106                JSR     PC,SUBCLR
016560  104024                        ERROR   24              ;CERR AFTER SCLR
                                                                                
                                                                                
016562  012765  100000  000000        MOV     #CCLR,RKCS1(R5)
016570  013765  001222  000010        MOV     $UNIT,RKCS2(R5)
016576  012765  000013  000000        MOV     #RECAL,RKCS1(R5)        ;RECAL CMD
                                                                ;RESET CYL DIFF/OFFSET & CYL ADDR REG
                                                                ;IN RKMR2 & RKMR3 RESF.
016604  013737  001414  003372        MOV     T10,TEMP1
016612  004737  044176                JSR     PC,FRDY         ;FIND RDY
016616  104124                        ERROR   124             ;RDY NOT SET AFTER RECAL CMD
                                                                                
016620  012765  000001  000026        MOV     #1,RKMR1(R5)    ;SELECT WORD 1
016626  004737  045534                JSR     PC,GSTAT
016632  032737  020000  003362        BIT     #D.RTZ,HMR2
016640  001001                        BNE     64$
016642  104244                        ERROR   244             ;RTZ NOT SET DUPING RECAL CMD
016644  013737  001412  003374  64$:  MOV     T1,TEMP2        ;SETUP TIMEOUT
```

```
016652  004737  044512                  JSR     PC,FATT1        ;FIND ATTN
016656  104055                          ERROR   55              ;NO ATTN AFTER RECAL CMD

016660  012737  050340  003424          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.AC  ;EXPECTED MSG AC
016666  005037  003426                  CLR     E.BC            ;EXPECTED MSG BC
016672  012737  001720  003430          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
016700  012737  000001  003432          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
016706  005037  003434                  CLR     E.A2            ;EXPECTED MSG A2
016712  012737  000002  003436          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
016720  012737  000003  003442          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3

016726  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
016732  000007                          .WORD   T.A2!T.B2!T.B3          ;& MSGS SPECIFIED HERE
016734  104221                          ERROR   221             ;MSG A0 ERROR AFTER RECAL CMD
016736  104275                          ERROR   275             ;MSG B0 ERROR
016740  104222                          ERROR   222             ;MSG A1 ERROR
016742  104276                          ERROR   276             ;MSG B1 ERROR

016744  005737  001362                  TST     CYLDIF          ;SEE IF MSG A2=0
016750  001401                          BEQ     65$             ;BR IF YES
016752  104047                          ERROR   47              ;MSG A2 NOT CLEARED AFTER RECAL CMD
016754  005737  001364          65$:    TST     CYLADD          ;SEE IF MSG B2=0
016760  001401                          BEQ     66$             ;BR IF YES
016762  104050                          ERROR   50              ;MSG B2 NOT CLEARED AFTER RECAL CMD
016764                          66$:

016764  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
016772  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
017000  012765  000005  000000          MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
017006  013737  001414  003372          MOV     T10,TEMP1
017014  004737  044176                  JSR     PC,FRDY         ;FIND RDY
017020  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
017022  004737  044460                  JSR     PC,TSTATN       ;TEST FOR ATTN
017026  000401                          BR      67$
017030  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
017032                          67$:

017032  012737  010340  003424          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
017040  005037  003426                  CLR     E.B0            ;EXPECTED MSG B0
017044  012737  001720  003430          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
017052  012737  000001  003432          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
017060  005037  003434                  CLR     E.A2            ;EXPECTED MSG A2
017064  012737  000002  003436          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
017072  012737  000003  003442          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3

017100  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
017104  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
017106  104273                          ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
017110  104265                          ERROR   265             ;MSG B0 ERROR
017112  104274                          ERROR   274             ;MSG A1 ERROR
017114  104266                          ERROR   266             ;MSG B1 ERROR


017116  023727  001432  000001          CMP     HEADA,#1        ;FOR HEAD 0, B3=1
017124  001401                          BEQ     3$
017126  104053                          ERROR   53              ;RECAL DID NOT RESET HEAD REG IN B3.
```

```
                                        3$:
017130  104415                                  SCOPI
017132  012706  001100                          MOV     #STACK,SP       ;RESTORE STK PTR
                                        ;
017136  004737  046106                          JSR     PC,SUBCLR
017142  104024                                  ERROR   24              ;CERR AFTER SCLR
                                        ;
017144  000300                                  SWAB    R0
017146  010065  000006                          MOV     R0,RKDA(R5)     ;HEAD #
017152  000300                                  SWAB    R0
                                        ;
017154  012765  000017  000000                  MOV     #SEEK,RKCS1(R5) ;SEEK CMD
017162  013737  001414  003372                  MOV     TIO,TEMP1
017170  004737  044176                          JSR     PC,FRDY         ;FIND RDY
017174  104156                                  ERROR   156             ;NO RDY AFTER SEEK TO SELF
017176  004737  044460                          JSR     PC,TSTATN
017202  104157                                  ERROR   157             ;NO ATTN AFTER SEEK TO SELF
017204  012737  050340  003424                  MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED AC
017212  020027  000003                          CMP     R0,#3
017216  001403                                  BEQ     4$              ;BR FOR HEAD 3
017220  005037  003426                          CLR     E.B0            ;FOR HEADS 0,1,2
017224  000403                                  BR      5$
017226  012737  002240  003426  4$:             MOV     #<D.SKI!D.FLT!D.IDAE>,E.B0      ;FOR HEAD 3
017234  012737  001720  003430  5$:             MOV     #<D.SPE!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
017242  012737  000001  003432                  MOV     #1,E.B1
017250  005037  003434                          CLR     E.A2
017254  012737  000002  003436                  MOV     #2,E.B2
017262  005700                                  TST     R0              ;SEE IF HEAD 0
017264  001004                                  BNE     6$              ;BR IF NO
017266  012737  001003  003442                  MOV     #<BIT9!3>,E.B3  ;LOAD EXPECTED B3 FOR HEAD 0 & MSG ID
017274  000412                                  BR      8$
017276  020027  000001          6$:             CMP     R0,#1           ;SEE IF HEAD 1
017302  001004                                  BNE     7$              ;BR IF NO
017304  012737  002003  003442                  MOV     #<BIT10!3>,E.B3 ;B3 FOR HEAD 1
017312  000403                                  BR      8$
017314  012737  004003  003442  7$:             MOV     #<BIT11!3>,E.B3 ;B3 FOR HEAD 2
017322                                  8$:
                                        ;
017322  004737  044720                          JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
017326  000007                                  .WORD   T.A2!T.B2!T.B3          ;& MSGS SPECIFIED HERE
017330  104114                                  ERROR   114             ;MSG A0 ERROR AFTER LOAD HEAD REG & SEEK CMD
017332  104115                                  ERROR   115             ;MSG B0 ERROR
017334  104322                                  ERROR   322             ;MSG A1 ERROR
017336  104323                                  ERROR   323             ;MSG B1 ERROR
                                        ;
017340  005737  001362                          TST     CYLDIF          ;SEE IF MSG A2=0
017344  001401                                  BEQ     68$             ;BR IF YES
017346  104324                                  ERROR   324             ;MSG A2 NOT CLEARED AFTER LOAD HEAD REG & SEEK CMD
017350  005737  001364          68$:            TST     CYLADD          ;SEE IF MSG B2=0
017354  001401                                  BEQ     69$             ;BR IF YES
017356  104325                                  ERROR   325             ;MSG B2 NOT CLEARED AFTER LOAD HEAD REG & SEEK CMD
017360                                  69$:
                                        ;
017360  020027  000003                          CMP     R0,#3
017364  001412                                  BEQ     9$              ;BR IF HEAD 3
```

```
4687
4688  017366  005037  003372                  CLR     TEMP1
4689  017372  116037  003324  003372          MOVB    ATTN(R0),TEMP1
4690  017400  023737  003372  001432          CMP     TEMP1,HEADA     ;FOR RKDA=HEAD 0, HEAD=1 IN B3
4691                                                                  ;FOR RKDA=HEAD 1, HEAD=2 IN B3
4692                                                                  ;FOR RKDA=HEAD 2, HEAD=4 IN B3
4693  017406  001401                          BEQ     9$
4694  017410  104054                          ERROR   54              ;HEAD DECODE IN B3 INCORRECT
4695
4696
4697  017412  005200                  9$:     INC     R0
4698  017414  020027  000004                  CMP     R0,#4           ;0 THRU 3 DONE?
4699  017420  001402                          BEQ     10$             ;BR IF YES
4700  017422  000137  016546                  JMP     1$              ;ELSE REPEAT
4701
4702  017426                          10$:
4703
4704  017426  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
4705  017434  013765  001222  000010          MOV     $UNIT,RKCS2(R5)
4706  017442  012765  000013  000000          MOV     #RECAL,RKCS1(R5)        ;RECAL CMD
4707  017450  013737  001414  003372          MOV     T10,TEMP1
4708  017456  004737  044176                  JSR     PC,FRDY         ;FIND RDY
4709  017462  104124                          ERROR   124             ;RDY NOT FOUND AFTER RECAL CMD
4710
4711  017464  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
4712  017472  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
4713  017500  012765  000005  000000          MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
4714  017506  013737  001414  003372          MOV     T10,TEMP1
4715  017514  004737  044176                  JSR     PC,FRDY         ;FIND RDY
4716  017520  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
4717  017522  004737  044460                  JSR     PC,TSTATN       ;TEST FOR ATTN
4718  017526  000401                          BR      71$
4719  017530  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
4720  017532                          71$:
4721
4722
4723  017532  004737  045534                  JSR     PC,GSTAT
4724  017536  032737  000040  003364          BIT     #D.IDAE,HMR3    ;SEE IF IDAE IS CLEARED
4725  017544  001401                          BEQ     70$             ;BR IF YES
4726  017546  104155                          ERROR   155             ;IDAE NOT CLEARED AFTER RECAL CMD
4727
4728  017550  012765  100000  000000  70$:    MOV     #CCLR,RKCS1(R5)
4729  017556  013737  001412  003374          MOV     T1,TEMP2        ;LOOK FOR ATTN FROM RECAL
4730  017564  004737  044512                  JSR     PC,FATT1
4731  017570  104055                          ERROR   55              ;NO ATTN AFTER RECAL CMD
4732
4733
4734                          ;;*****************************************************************
4735                          ;*TEST 20       SEEK TO CYL 0
4736                          ;*
4737                          ;*      TESTS THE ABILITY TO DO A SEEK CMD.
4738                          ;*      VERIFIES THERE WAS NO MOVEMENT BY CHECKING ALL APPROPRIATE
4739                          ;*      STATUS BITS.  VERIFIES CMD COMPLETION BETWEEN 10-15USEC.
4740                          ;*      READ HEADER IS NOT PERFORMED AS THE PACK MAY NOT BE FORMATTED.
4741                          ;*
4742                          ;;*****************************************************************
```

```
 4743  017572  000004                          TST20:  SCOPE
 4744  017574  012737  000001  001174                  MOV     #1,$TIMES       ;;DO 1 ITERATION
 4745  017602  012706  001100                          MOV     #STACK,SP       ;RESTORE STK PTR
 4746
 4747  017606  004737  046106                          JSR     PC,SUBCLR       ;SUBSYS CLEAR & GET STATUS
 4748  017612  104024                                  ERROR   24              ;CERR AFTER SCLR
 4749  017614  004737  046476                          JSR     PC,RDCYLA       ;READ CYL ADDR IN RKMR3
 4750  017620  005737  001364                          TST     CYLADD
 4751  017624  001401                                  BEQ     1$
 4752  017626  104130                                  ERROR   130             ;CYL ADDR NOT CLEARED AFTER SCLR
 4753  017630                                  1$:
 4754  017630  104415                                  SCOPI
 4755  017632  012706  001100                          MOV     #STACK,SP       ;RESTORE STK PTR
 4756
 4757  017636  004737  046106                          JSR     PC,SUBCLR
 4758  017642  104024                                  ERROR   24              ;CERR AFTER SCLR
 4759
 4760  017644  012765  000017  000000                  MOV     #SEEK,RKCS1(R5) ;SEEK CMD: SEEK TO SELF
 4761  017652  012737  000005  003372                  MOV     #5,TEMP1        ;SETUP 100US TIMEOUT
 4762  017660  004737  044176                          JSR     PC,FRDY         ;FIND RDY & GET STATUS
 4763  017664  104131                                  ERROR   131             ;RDY NOT SET AFTER SEEK CMD
 4764  017666  012737  000005  003372                  MOV     #5,TEMP1        ;SETUP 100US TIMEOUT
 4765
 4766  017674  004737  044606                          JSR     PC,FATT2        ;FIND ATTN
 4767  017700  104132                                  ERROR   132             ;NO ATTN AFTER SEEK CMD
 4768  017702  032737  100000  003334                  BIT     #CERR,HCS1
 4769  017710  001401                                  BEQ     64$
 4770  017712  104210                                  ERROR   210             ;CERR AFTER SEEK CMD
 4771  017714                                  64$:
 4772
 4773  017714  012737  050340  003424                  MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
 4774  017722  005037  003426                          CLR     E.B0            ;EXPECTED MSG B0
 4775  017726  012737  001720  00343C                  MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
 4776  017734  012737  000001  003432                  MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
 4777  017742  005037  003434                          CLR     E.A2            ;EXPECTED MSG A2
 4778  017746  012737  000002  003436                  MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
 4779  017754  012737  000003  003442                  MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
 4780
 4781  017762  004737  044720                          JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
 4782  017766  000003                                  .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
 4783  017770  104133                                  ERROR   133             ;MSG A0 ERROR AFTER SEEK CMD
 4784  017772  104134                                  ERROR   134             ;MSG B0 ERROR
 4785  017774  104135                                  ERROR   135             ;MSG A1 ERROR
 4786  017776  104136                                  ERROR   136             ;MSG B1 ERROR
 4787  020000  005737  001362                          TST     CYLDIF
 4788  020004  001401                                  BEQ     65$
 4789  020006  104137                                  ERROR   137             ;CYL DIFF NOT CLEARED AFTER SEEK CMD
 4790
 4791  020010                                  65$:
 4792
 4793  020010  012765  100000  000000                  MOV     #CCLR,RKCS1(R5)
 4794  020016  013765  001222  000010                  MOV     $UNIT,RKCS2(R5) ;DRIVE#
 4795  020024  012765  000005  000000                  MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
 4796  020032  013737  001414  003372                  MOV     T10,TEMP1
 4797  020040  004737  044176                          JSR     PC,FRDY         ;FIND RDY
 4798  020044  104151                                  ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
```

```
 4799  020046  004737  044460            JSR     PC,TSTATN       ;TEST FOR ATTN
 4800  020052  000401                    BR      66$
 4801  020054  104154                    ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
 4802  020056                          66$:
 4803
 4804  020056  012737  010340  003424    MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
 4805  020064  005037  003426            CLR     E.B0            ;EXPECTED MSG B0
 4806  020070  012737  001720  003430    MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
 4807  020076  012737  000001  003432    MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
 4808  020104  005037  003434            CLR     E.A2            ;EXPECTED MSG A2
 4809  020110  012737  000002  003436    MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
 4810  020116  012737  000003  003442    MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
 4811
 4812  020124  004737  044720            JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
 4813  020130  000003                    .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
 4814  020132  104273                    ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
 4815  020134  104265                    ERROR   265             ;MSG B0 ERROR
 4816  020136  104274                    ERROR   274             ;MSG A1 ERROR
 4817  020140  104266                    ERROR   266             ;MSG B1 ERROR
 4818
 4819  020142  005737  001354            TST     CYLADD
 4820  020146  001401                    BEQ     TST21           ;;GO TO NEXT TEST
 4821  020150  104140                    ERROR   140             ;CYL ADDR IN B2 NOT CLEARED AFT SEEK CMD.
 4822
 4823                          ;;*****************************************************************
 4824                          ;*TEST 21       TEST SECTOR COUNT REG. IN MSG B3
 4825                          ;;*****************************************************************
 4826  020152  000004          TST21:  SCOPE
 4827  020154  012737  000001  001174    MOV     #1,$TIMES       ;;DO 1 ITERATION
 4828  020162  012706  001100            MOV     #STACK,SP       ;RESTORE STK PTR
 4829
 4830  020166  004737  046106            JSR     PC,SUBCLR       ;SUBSYS CLEAR & GET STATUS
 4831  020172  104024                    ERROR   24              ;CERR AFTER SCLR
 4832  020174  012737  020324  001176    MOV     #2$,$ESCAPE     ;GO TO NEXT TEST IF ANY ERROR DETECTED
 4833
 4834  020202  012737  000025  001400    MOV     #21.,SECNT      ;22 SECTOR FORMAT TEST
 4835
 4836  020210  004737  046236            JSR     PC,FSO22                ;FIND SECTOR 0
 4837  020214  104142                    ERROR   142             ;SECTOR 0 NOT FOUND BY TIMEOUT
 4838
 4839  020216  005037  001402            CLR PSEC                ;PREVIOUS SECTOR
 4840  020222  004737  046322    64$:    JSR     PC,FNS22                ;FIND NEXT SECTOR
 4841  020226  104143                    ERROR   143             ;DIFFERENT SECTOR  NOT FOUND BY TIMEOUT
 4842  020230  013737  001402  001404    MOV     PSEC,ESEC
 4843  020236  062737  000001  001404    ADD     #1,ESEC         ;SETUP EXPECTED SECTOR
 4844  020244  013737  001406  001402    MOV     SECTOR,PSEC     ;UPDATE PREV SECTOR
 4845  020252  004737  046166            JSR     PC,RDSEC                ;READ SECTOR
 4846  020256  023737  001406  001402    CMP     SECTOR,PSEC
 4847  020264  001407                    BEQ     65$             ;BR IF READ SAME TWICE
 4848  020266  004737  046166            JSR     PC,RDSEC
 4849  020272  023737  001406  001402    CMP     SECTOR,PSEC
 4850  020300  001401                    BEQ     65$             ;TRY 1 MORE TIME
 4851  020302  104144                    ERROR   144             ;MSG B3 ERROR, SECTOR REG UNSTABLE
 4852                                                          ;MAY BE DURING SECTOR PULSE TIME
 4853  020304  023737  001406  001404  65$:    CMP     SECTOR,ESEC
 4854  020312  001401                    BEQ     66$
```

```
4855  020314  104145                        ERROR   145             ;MSG B3 ERROR BETWEEN SECTOR COUNTS
4856  020316  005337  001400        66$:    DEC     SECNT
4857  020322  001337                        BNE     64$             ;BR IF SECTOR COUNT NOT DONE
4858
4859
4860  020324  005037  001176        2$:     CLR     $ESCAPE
4861
4862                                ;;*********************************************************************
4863                                ;*TEST 22       DETECT OUTER LIMIT
4864                                ;*
4865                                ;*      THIS TEST VERIFIES THAT THE ABOVE TEST DID ACTUALLY POSITION ON CYL 0
4866                                ;*      BY DETECTING OUTER LIMIT AS THE ADJACENT CYL.
4867                                ;*      AN ERROR IN THIS TEST INDICATES:
4868                                ;*
4869                                ;*              A.  HEADS WERE NOT ON CYL 0
4870                                ;*      AND/OR  B.  COULD NOT SEEK IN REVERSE DIRECTION.
4871                                ;*
4872                                ;*********************************************************************
4873  020330  000004                TST22:  SCOPE
4874  020332  012737  000001  001174        MOV     #1,$TIMES       ;;DO 1 ITERATION
4875  020340  012706  001100                MOV     #STACK,SP       ;RESTORE STK PTR
4876
4877  020344  004737  046106                JSR     PC,SUBCLR       ;SUBSYS CLEAR & GET STATUS
4878  020350  104024                        ERROR   24              ;CERR AFTER SCLR
4879
4880  020352  005037  001410                CLR     LPFLG
4881  020356  005237  001462                INC     BYPCERR         ;BYPASS CHECKING FOR ANY CERR IN GSTAT1
4882  020362  005237  003316                INC     UNLD            ;USED FOR VALID HALT
4883
4884  020366  012765  000020  000026        MOV     #PAT,RKMR1(R5)  ;PARITY & WORD 0
4885  020374  012765  000001  000020        MOV     #1,RKDC(R5)     ;CYL 1
4886  020402  012765  000017  000000        MOV     #SEEK,RKCS1(R5) ;SEEK CMD
4887  020410  013737  001414  003372        MOV     T10,TEMP1
4888  020416  004737  044176                JSR     PC,FRDY         ;FIND RDY
4889  020422  104122                        ERROR   122             ;NO RDY FROM SEEK WITH BAD PARITY
4890  020424  004737  044460                JSR     PC,TSTATN       ;TEST FOR ATTN
4891  020430  104125                        ERROR   125             ;NO ATTN FROM SEEK WITH BAD PARITY
4892  020432  012737  050340  003424        MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED A0
4893  020440  012737  001200  003426        MOV     #<D.FLT!D.PAR>,E.B0
4894  020446  012737  001720  003430        MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
4895  020454  012737  000001  003432        MOV     #1,E.B1
4896
4897  020462  004737  044720                JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
4898  020466  000000                        .WORD   0!0!0           ;& MSGS SPECIFIED HERE
4899  020470  104110                        ERROR   110             ;MSG A0 ERROR AFTER SEEK WITH BAD PARITY
4900  020472  104111                        ERROR   111             ;MSG B0 ERROR
4901  020474  104146                        ERROR   146             ;MSG A1 ERROR
4902  020476  104147                        ERROR   147             ;MSG B1 ERROR
4903
4904  020500  012765  100000  000000        MOV     #CCLR,RKCS1(R5)
4905  020506  013765  001222  000010        MOV     $UNIT,RKCS2(R5) ;DRIVE#
4906  020514  012765  000005  000000        MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
4907  020522  013737  001414  003372        MOV     T10,TEMP1
4908  020530  004737  044176                JSR     PC,FRDY         ;FIND RDY
4909  020534  104151                        ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
4910  020536  004737  044460                JSR     PC,TSTATN       ;TEST FOR ATTN
```

```
4911  020542  000401                          BR      64$
4912  020544  104154                          ERROR   154             ;ATTN NO. CLEARED AFTER DRIVE CLEAR CMD
4913  020546                          64$:
4914
4915  020546  012737  010340  003424          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
4916  020554  005037  003426                  CLR     E.B0            ;EXPECTED MSG B0
4917  020560  012737  001720  003430          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
4918  020566  012737  000001  003432          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
4919  020574  005037  003434                  CLR     E.A2            ;EXPECTED MSG A2
4920  020600  012737  000002  003436          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
4921  020606  012737  000003  003442          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
4922
4923  020614  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
4924  020620  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
4925  020622  104273                          ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
4926  020624  104265                          ERROR   265             ;MSG B0 ERROR
4927  020626  104274                          ERROR   274             ;MSG A1 ERROR
4928  020630  104266                          ERROR   266             ;MSG B1 ERROR
4929
4930
4931
4932  020632  012765  000000  000020          MOV     #0,RKDC(R5)     ;CYL 0
4933  020640  012765  000017  000000          MOV     #SEEK,RKCS1(R5) ;SEEK TO CYL 0
4934  020646  013737  001414  003372          MOV     T10,TEMP1
4935  020654  004737  044176                  JSR     PC,FRDY         ;FIND RDY
4936  020660  104131                          ERROR   131             ;NO RDY AFTER SEEK CMD
4937  020662  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
4938  020670  004737  045534                  JSR     PC,GSTAT
4939  020674  004737  046742                  JSR     PC,FLIM         ;FIND LIMIT DETECT
4940  020700  104160                          ERROR   160             ;LIMIT DETECT NOT FOUND BEFORE TIMEOUT
4941
4942
4943  020702  032737  040000  003362          BIT     #D.UNLD,HMR2
4944  020710  001003                          BNE     1$
4945  020712  104305                          ERROR   305             ;DRIVE NOT UNLOADING AFTER LIMIT DETECT
4946  020714  000137  021422                  JMP     30$             ;BYPASS REST OF TEST
4947
4948
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4955
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4959
4960
4961
4962
4963
4964  020720  012737  021336  001176  1$:     MOV     #20$,$ESCAPE    ;MUST ESCAPE TO CYCLE UP DRIVE & TEST SWR
4965  020726  012737  070140  003424          MOV     #<D.DSC!D.PIP!D.SPIN!D.VV!D.DRA>,E.A0    ;EXPECTED A0
4966  020734  012737  002200  003426          MOV     #<D.SKI!D.FLT>,E.B0
```

```
4967  020742  012737  045720  003430          MOV     #<D.UNLD!D.REV!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
4968  020750  012737  030001  003432          MOV     #<D.LIMD!D.NMOV!1>,E.B1
4969
4970  020756  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
4971  020762  000000                          .WORD   0!0!0           ;& MSGS SPECIFIED HERE
4972  020764  104161                          ERROR   161             ;MSG A0 ERROR AFTER OUTER LIMIT DETECT
4973  020766  104162                          ERROR   162             ;MSG B0 ERROR
4974  020770  104163                          ERROR   163             ;MSG A1 ERROR
4975  020772  104164                          ERROR   164             ;MSG B1 ERROR
4976
4977  020774  004737  044460                  JSR     PC,TSTATN
4978  021000  104165                          ERROR   165             ;NO ATTN AFTER OUTER LIMIT DETECT
4979  021002  005037  001462                  CLR     BYPCERR         ;ALLOW CHECKING CERR IN GSTAT1
4980
4981  021006  004737  046106                  JSR     PC,SUBCLR       ;SUBSYS CLR
4982  021012  104024                          ERROR   24              ;CERR AFTER SCLR
4983  021014  013737  001414  003374          MOV     T10,TEMP2       ;SET UP TIMEOUT
4984  021022  004737  047020                  JSR     PC,FHDHM        ;FIND HEAD HOME
4985  021026  104166                          ERROR   166             ;HEAD HOME NOT FOUND BEFORE TIMEOUT
4986  021030  004737  047074                  JSR     PC,FLOAD        ;FIND LOAD HEADS
4987  021034  104167                          ERROR   167             ;LOAD HEADS NOT FOUND BEFORE TIMEOUT
4988  021036  013737  001414  003374          MOV     T10,TEMP2       ;SETUP TIMEOUT
4989  021044  004737  044512                  JSR     PC,FATT1        ;FIND ATTN
4990  021050  104067                          ERROR   67              ;ATTN NOT FOUND BEFORE TIMEOUT
4991  021052  005037  001176          25:     CLR     $ESCAPE
4992
4993  021056  012737  050340  003424          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
4994  021064  005037  003426                  CLR     E.B0            ;EXPECTED MSG B0
4995  021070  012737  001720  003430          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
4996  021076  012737  000001  003432          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
4997  021104  005037  003434                  CLR     E.A2            ;EXPECTED MSG A2
4998  021110  012737  000002  003436          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
4999  021116  012737  000003  003442          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
5000
5001  021124  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
5002  021130  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
5003  021132  104063                          ERROR   63              ;MSG A0 ERROR AT END OF HEAD LOADING
5004  021134  104064                          ERROR   64              ;MSG B0 ERROR
5005  021136  104065                          ERROR   65              ;MSG A1 ERROR
5006  021140  104066                          ERROR   66              ;MSG B1 ERROR
5007
5008  021142  005737  001362                  TST     CYLDIF          ;SEE IF MSG A2=0
5009  021146  001401                          BEQ     65$             ;BR IF YES
5010  021150  104175                          ERROR   175             ;MSG A2 NOT CLEARED AT END OF HEAD LOADING
5011  021152  005737  001364          65$:    TST     CYLADD          ;SEE IF MSG B2=0
5012  021156  001401                          BEQ     66$             ;BR IF YES
5013  021160  104176                          ERROR   176             ;MSG B2 NOT CLEARED AT EN_ OF HEAD LOADING
5014  021162                          66$:
5015
5016  021162  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
5017  021170  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
5018  021176  012765  000005  000000          MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
5019  021204  013737  001414  003372          MOV     T10,TEMP1
5020  021212  004737  044176                  JSR     PC,FRDY         ;FIND RDY
5021  021216  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
5022  021220  004737  044460                  JSR     PC,TSTATN       ;TEST FOR ATTN
```

```
                                        BR      67$
                                        ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
                                67$:
                                
021230  012737  010340  003424        MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
021236  005037  003426                CLR     E.B0            ;EXPECTED MSG B0
021242  012737  001720  003430        MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
021250  012737  000001  003432        MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
021256  005037  003434                CLR     E.A2            ;EXPECTED MSG A2
021262  012737  000002  003436        MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
021270  012737  000003  003442        MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3

021276  004737  044720                JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
021302  000003                        .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
021304  104273                        ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
021306  104265                        ERROR   265             ;MSG B0 ERROR
021310  104274                        ERROR   274             ;MSG A1 ERROR
021312  104266                        ERROR   266             ;MSG B1 ERROR

021314  005037  003316                CLR     UNLD            ;USED FOR VALID HALT
021320  004737  050036                JSR     PC,SWTST        ;SEE IF SW 14 OR 8 IS SET
021324  000436                        BR      TST23           ;;GO TO NEXT TEST
                                                            ;RETURN HERE IF SW 14 IS SET OR
                                                            ;SW 8 WITH SWR <7:0> APPLY

021326  005037  001176        10$:    CLR     $ESCAPE
021332  000177  157550                JMP     @$LPADR
021336                          20$:

021336  004737  046106                JSR     PC,SUBCLR
021342  104024                        ERROR   24              ;CERR AFTER SCLR

021344  012765  000011  000000        MOV     #SRTSPL,RKCS1(R5)       ;START SPINDLE CMD
021352  013737  001414  003372        MOV     T10,TEMP1       ;SET TIMEOUT
021360  004737  044176                JSR     PC,FRDY         ;FIND RDY
021364  104121                        ERROR   121             ;RDY NOT FOUND AFTER ST SPIN CMD.

021366  013737  001416  003374        MOV     T100,TEMP2      ;SETUP  TIMEOUT
021374  004737  044512                JSR     PC,FATT1        ;FIND ATTN
021400  104067                        ERROR   67              ;NO ATTN AFTER ST SPIN CMD.
021402  005237  001410                INC     LPFLG
021406  032777  001000  157524        BIT     #SW9,@SWR       ;LOOP ON ERROR?
021414  001344                        BNE     10$             ;YES, RECONDITION DRIVE
021416  000137  021052                JMP     2$              ;RETURN TO MAINLINE
021422                          30$:


;;*****************************************************************
;*TEST 23       READ HEADERS, ALL TRACKS, CYL 0
;*
;*      THIS TEST DOES NOT CHECK THE HEADERS, BUT ONLY THE FACT
;*      THAT HEADERS CAN BE READ CORRECTLY BY CHECKING CERR & DTE.
;*
;*      THIS TEST IS VALID ONLY IF THE PACK HAS NOT BEEN ZERO'D OUT.
```

```
                                        ;*
                                        ;;*****************************************************************
005081  021422  000004                  T$T23:  SCOPE
005082  021424  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
005083  021432  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
005084
005085  021436  005037  001430                  CLR     HEAD            ;HEAD COUNTER
005086
005087  021442                          1$:
005088  021442  104415                          SCOP1
005089  021444  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
005090
005091  021450  004737  046106                  JSR     PC,SUBCLR
005092  021454  104024                          ERROR   24              ;CERR AFTER SCLR
005093
005094  021456  000337  001430                  SWAB    HEAD
005095  021462  013765  001430  000006          MOV     HEAD,RKDA(R5)   ;LOAD HEAD REG
005096  021470  000337  001430                  SWAB    HEAD
005097
005098  021474  012700  001674                  MOV     #RHTAB,R0
005099  021500  012765  000025  000000          MOV     #<RDHEAD>,RKCS1(R5)     ;READ HEADER CMD
005100  021506  013737  001426  003372          MOV     T50000,TEMP1    ;SETUP  TIMEOUT
005101  021514  004737  044176                  JSR     PC,FRDY         ;FIND RDY
005102  021520  104171                          ERROR   171             ;NO RDY AFTER READ HEADER CMD
005103  021522  032737  100000  003334          BIT     #CERR,HCS1
005104  021530  001405                          BEQ     64$
005105  021532  104174                          ERROR   174             ;CERR AFTER READ HEADER CMD
005106  021534  104401  056606                  TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
005107  021540  000137  043470                  JMP     $EOP            ;ABORT DRIVE
005108
005109  021544  016520  000024          64$:    MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
005110  021550  016520  000024                  MOV     RKDB(R5),(R0)+  ;2'ND WORD
005111  021554  016520  000024                  MOV     RKDB(R5),(R0)+  ;3'RD WORD
005112
005113
005114  021560  032765  100000  000010          BIT     #DLT,RKCS2(R5)
005115  021566  001407                          BEQ     65$
005116  021570  004737  045534                  JSR     PC,GSTAT
005117  021574  104173                          ERROR   173             ;DLT AFTER READ HEADER CMD
005118  021576  104401  056606                  TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
005119  021602  000137  043470                  JMP     $EOP            ;ABORT DRIVE
005120  021606                          65$:
005121
005122  021606  012737  010340  003424          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
005123  021614  005037  003426                  CLR     E.B0            ;EXPECTED MSG B0
005124  021620  012737  001720  003430          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
005125  021626  012737  000001  003432          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
005126  021634  005037  003434                  CLR     E.A2            ;EXPECTED MSG A2
005127  021640  012737  000002  003436          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
005128  021646  012737  000003  003442          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
005129
005130  021654  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
005131  021660  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
005132  021662  104301                          ERROR   301             ;MSG A0 ERROR AFTER READ HEADER CMD
005133  021664  104271                          ERROR   271             ;MSG B0 ERROR
005134  021666  104302                          ERROR   302             ;MSG A1 ERROR
```

```
                        ERROR   272             ;MSG B1 ERROR

021672  005737  001362        TST     CYLDIF          ;SEE IF MSG A2=0
021676  001401                BEQ     66$             ;BR IF YES
021700  104172                ERROR   172             ;MSG A2 NOT CLEARED AFTER READ HEADER CMD
021702  005737  001364  66$:  TST     CYLADD          ;SEE IF MSG B2=0
021706  001401                BEQ     67$             ;BR IF YES
021710  104264                ERROR   264             ;MSG B2 NOT CLEARED AFTER READ HEADER CMD
021712                  67$:
021712  005237  001430        INC     HEAD
021716  023727  001430  000003  CMP     HEAD,#3         ;ALL HEADS DONE?
021724  001246                BNE     1$              ;REPEAT IF NO


                        ;*********************************************************************
                        ;*TEST 24       BASIC WRITE/READ HEADER & HEAD SWITCHING TEST
                        ;*
                        ;*      THIS TEST CHECKS HEAD SWITCHING BY WRITING UNIQUE HEADERS
                        ;*      ON EACH TRACK OF CYL 0, READING BACK & VERIFYING THEY REMAINED
                        ;*      UNIQUE. 22 SECTOR FORMAT IS USED
                        ;*
                        ;*      I.E.    TRACK 0: ALL 0'S FOR ALL SECTOR HEADERS
                        ;*              TRACK 1: 0101 FOR ALL SECTOR HEADERS
                        ;*              TRACK 2: ALL 1'S FOR ALL SECTOR HEADERS
                        ;*
                        ;*********************************************************************
021726  000004          ST24:   SCOPE
021730  012737  000001  001174        MOV     #1,$TIMES       ;;DO 1 ITERATION
021736  012706  001100              MOV     #STACK,SP       ;RESTORE STK PTR

021742  005237  003320              INC     BADHDR          ;USED FOR VALID HALT
021746  005037  001430              CLR     HEAD            ;HEAD CTR

021752  104415                      SCOP1
021754  012706  001100              MOV     #STACK,SP       ;RESTORE STK PTR

021760  004737  046106              JSR     PC,SUBCLR
021764  104024                      ERROR   24              ;CERR AFTER SCLR

021766  052765  000020  000010  1$:     BIS     #BAI,RKCS2(R5)  ;SET BUSS ADDR INCR INHIBIT
021774  012765  001470  000004        MOV     #HDTAB,RKBA(R5) ;HEADER WORD TABLE
022002  012765  177676  000002        MOV     #-66.,RKWC(R5)  ;WORD COUNT.
022010  000337  001430              SWAB    HEAD
022014  013765  001430  000006        MOV     HEAD,RKDA(R5)   ;SETUP HEAD ADDR
022022  000337  001430              SWAB    HEAD

022026  013700  001430              MOV     HEAD,R0
022032  006300                      ASL     R0              ;DOUBLE R0
022034  016037  001444  001470        MOV     DATAO(R0),HDTAB ;SETUP HEADER WORD FOR RKBA

022042  012765  000027  000000        MOV     #<WRHEAD>,RKCS1(R5)     ;WRITE HEADER CMD
022050  013737  001426  003372        MOV     T50000,TEMP1    ;SETUP TIMEOUT
022056  004737  044176              JSR     PC,FRDY         ;FIND RDY
022062  104200                      ERROR   200             ;NO RDY AFTER WRITE HEADER CMD
022064  004737  045534              JSR     PC,GSTAT        ;GET FRESH STATUS
```

```
5191  022070  032737  100000  003334          BIT     #CERR,HCS1
5192  022076  001405                          BEQ     64$
5193  022100  104201                          ERROR   201             ;CERR AFTER WRITE HEADER CMD
5194  022102  104401  056606                  TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
5195  022106  000137  043470                  JMP     $EOP            ;ABORT DRIVE
5196  022112                          64$:
5197
5198  022112  012737  010340  003424          MOV     #<D!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
5199  022120  005037  003426                  CLR     E.B0            ;EXPECTED MSG B0
5200  022124  012737  001720  003430          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
5201  022132  012737  000001  003432          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
5202  022140  005037  003434                  CLR     E.A2            ;EXPECTED MSG A2
5203  022144  012737  000002  003436          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
5204  022152  012737  000003  003442          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
5205
5206  022160  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
5207  022164  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
5208  022166  104277                          ERROR   277             ;MSG A0 ERROR AFTER WRITE HEADER CMD
5209  022170  104267                          ERROR   267             ;MSG B0 ERROR
5210  022172  104300                          ERROR   300             ;MSG A1 ERROR
5211  022174  104270                          ERROR   270             ;MSG B1 ERROR
5212
5213
5214  022176  005737  001362                  TST     CYLDIF          ;SEE IF MSG A2=0
5215  022202  001401                          BEQ     65$             ;BR IF YES
5216  022204  104303                          ERROR   303             ;MSG A2 NOT CLEARED AFTER WRITE HEADER CMD
5217  022206  005737  001364          65$:    TST     CYLADD          ;SEE IF MSG B2=0
5218  022212  001401                          BEQ     66$             ;BR IF YES
5219  022214  104304                          ERROR   304             ;MSG B2 NOT CLEARED AFTER WRITE HEADER CMD
5220  0222.                           66$:
5221
5222  022216  005237  001430                  INC     HEAD
5223  022222  023727  001430  000003          CMP     HEAD,#3
5224  022230  001256                          BNE     1$
5225
5226  022232  005037  001430                  CLR     HEAD            ;HEAD CTR
5227  022236  104415                          SCOP1
5228  022240  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
5229
5230  022244  004737  046106                  JSR     PC,SUBCLR
5231  022250  104024                          ERROR   24              ;CERR AFTER SCLR
5232
5233
5234
5235  022252  000337  001430          2$:     SWAB    HEAD
5236  022256  013765  001430  000006          MOV     HEAD,RKDA(R5)   ;SETUP HEAD ADDR
5237  022264  000337  001430                  SWAB    HEAD
5238
5239  022270  012700  001674                  MOV     #RHTAB,R0
5240  022274  012765  000025  000000          MOV     #<RDHEAD>,RKCS1(R5)     ;READ HEADER CMD
5241  022302  013737  001426  003372          MOV     T50000,TEMP1    ;SETUP  TIMEOUT
5242  022310  004737  044176                  JSR     PC,FRDY         ;FIND RDY
5243  022314  104171                          ERROR   171             ;NO RDY AFTER READ HEADER CMD
5244  022316  032737  100000  003334          BIT     #CERR,HCS1
5245  022324  001405                          BEQ     67$
5246  022326  104174                          ERROR   174             ;CERR AFTER READ HEADER CMD
```

```
5247  022330  104401  056606          TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
5248  022334  000137  043470          JMP     $EOP            ;ABORT DRIVE
5249
5250  022340  016520  000024  67$:    MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
5251  022344  016520  000024          MOV     RKDB(R5),(R0)+  ;2'ND WORD
5252  022350  016520  000024          MOV     RKDB(R5),(R0)+  ;3'RD WORD
5253
5254
5255  022354  032765  100000  000010  BIT     #DLT,RKCS2(R5)
5256  022362  001407                  BEQ     68$
5257  022364  004737  045534          JSR     PC,GSTAT
5258  022370  104173                  ERROR   173             ;DLT AFTER READ HEADER CMD
5259  022372  104401  056606          TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
5260  022376  000137  043470          JMP     $EOP            ;ABORT DRIVE
5261  022402                  68$:
5262
5263  022402  012737  010340  003424  MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
5264  022410  005037  003426          CLR     E.B0            ;EXPECTED MSG B0
5265  022414  012737  001720  003430  MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
5266  022422  012737  000001  003432  MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
5267  022430  005037  003434          CLR     E.A2            ;EXPECTED MSG A2
5268  022434  012737  000002  003436  MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
5269  022442  012737  000003  003442  MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
5270
5271  022450  004737  044720          JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
5272  022454  000003                  .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
5273  022456  104301                  ERROR   301             ;MSG A0 ERROR AFTER READ HEADER CMD
5274  022460  104271                  ERROR   271             ;MSG B0 ERROR
5275  022462  104302                  ERROR   302             ;MSG A1 ERROR
5276  022464  104272                  ERROR   272             ;MSG B1 ERROR
5277
5278
5279  022466  005737  001362          TST     CYLDIF          ;SEE IF MSG A2=0
5280  022472  001401                  BEQ     69$             ;BR IF YES
5281  022474  104172                  ERROR   172             ;MSG A2 NOT CLEARED AFTER READ HEADER CMD
5282  022476  005737  001364  69$:    TST     CYLADD          ;SEE IF MSG B2=0
5283  022502  001401                  BEQ     70$             ;BR IF YES
5284  022504  104264                  ERROR   264             ;MSG B2 NOT CLEARED AFTER READ HEADER CMD
5285  022506                  70$:
5286  022506  000337  001430          SWAB    HEAD
5287  022512  013765  001430  000006  MOV     HEAD,RKDA(R5)   ;RESTORE RKDA
5288  022520  000337  001430          SWAB    HEAD
5289
5290  022524  012701  001674          MOV     #RHTAB,R1
5291
5292  022530  005037  001442          CLR     WDCNT           ;HEADER WORD COUNT
5293  022534  013700  001430          MOV     HEAD,R0
5294  022540  006300                  ASL     R0              ;DOUBLE R0
5295  022542  016037  001444  003372  MOV     DATA0(R0),TEMP1 ;GET THE 'SHOULD BE' DATA
5296  022550  012137  001454  3$:     MOV     (R1)+,HDWD      ;READ HEADER WORD
5297  022554  023737  001454  003372  CMP     HDWD,TEMP1
5298  022562  001401                  BEQ     4$
5299  022564  104202                  ERROR   202             ;READ HEADER MISMATCH
5300  022566  005237  001442  4$:     INC     WDCNT
5301  022572  023727  001442  000003  CMP     WDCNT,#3        ;DO ONLY 1 SECTOR
5302  022600  001363                  BNE     3$
```

```
                                                INC     HEAD
022602  005237  001430                          CMP     HEAD,#3         ;ALL 3 HEADS DONE?
022606  023727  001430  000003                  BEQ     TST25           ;;GO TO NXT TST IF YES
022614  001402                                  JMP     25              ;ELSE REPEAT
022616  000137  022252
                                        ;;*****************************************************************
                                        ;*TEST 25       BASIC WRITE/READ HEADER TEST; ALL 1'S, 20 SECTORS
                                        ;*
                                        ;*      USING HEAD 0, WRITE & READ 20 SECTOR HEADERS BY WRITING ALL
                                        ;*      1'S AS HEADERS.  ATTEMPT TO FIND SECTORS 20 & 21.  VERIFY
                                        ;*      THEY ARE NO LONGER THERE BY READING 22 SECTORS AND NOT
                                        ;*      FINDING 0'S AS DATA FROM THE PREVIOUS TEST.
                                        ;*
                                        ;*****************************************************************
022622  000004                          TST25:  SCOPE
022624  012737  000001  001174                  MOV     #1,$TIMES       ;;DO 1 ITERATION
022632  012706  001100                          MOV     #STACK,SP       ;RESTORE STK PTR

022636  004737  046106                          JSR     PC,SUBCLR
022642  104024                                  ERROR   24              ;CERR AFTER SCLR
022644  052765  000020  000010                  BIS     #BAI,RKCS2(R5)  ;SET BUSS ADDR INCR INHIBIT
022652  012765  001450  000004                  MOV     #DATA1,RKBA(R5) ;XFER 1'S ONLY
022660  012765  177704  000002                  MOV     #-60.,RKWC(R5)  ;WORD COUNT

022666  012765  010027  000000                  MOV     #<CFMT!WRHEAD>,RKCS1(R5)        ;WRITE HEADER CMD
022674  013737  001426  003372                  MOV     T50000,TEMP1    ;SETUP TIMEOUT
022702  004737  044176                          JSR     PC,FRDY         ;FIND RDY
022706  104200                                  ERROR   200             ;NO RDY AFTER WRITE HEADER CMD
022710  004737  045534                          JSR     PC,GSTAT        ;GET FRESH STATUS
022714  032737  100000  003334                  BIT     #CERR,HCS1
022722  001405                                  BEQ     64$
022724  104201                                  ERROR   201             ;CERR AFTER WRITE HEADER CMD
022726  104401  056606                          TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
022732  000137  043470                          JMP     $EOP            ;ABORT DRIVE
022736                                  64$:

022736  012765  010001  000000                  MOV     #<CFMT!SELDRV>,RKCS1(R5)        ;GET 20 SECTOR STATUS
022744  013737  001414  003372                  MOV     T10,TEMP1
022752  004737  044176                          JSR     PC,FRDY         ;FIND RDY
022756  104117                                  ERROR   117             ;NO RDY AFTER SELDRV CMD
022760  032737  001000  003362                  BIT     #D.FORM,HMR2
022766  001001                                  BNE     1$
022770  104312                                  ERROR   312             ;FORMAT NOT SET AFTER WRITE HDR CMD

022772                                  1$:

022772  012737  010340  003424                  MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
023000  005037  003426                          CLR     E.B0            ;EXPECTED MSG B0
023004  012737  001720  003430                  MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
023012  012737  000001  003432                  MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
023020  005037  003434                          CLR     E.A2            ;EXPECTED MSG A2
023024  012737  000002  003436                  MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
023032  012737  000003  003442                  MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
```

```
                                                JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
                                                .WORD   0!0!0           ;& MSGS SPECIFIED HERE
                                                ERROR   277             ;MSG A0 ERROR AFTER WRITE HEADER CMD
                                                ERROR   267             ;MSG B0 ERROR
                                                ERROR   300             ;MSG A1 ERROR
                                                ERROR   270             ;MSG B1 ERROR

                                                CLR     SECNT           ;SECTOR COUNT
                                        2$:
                                                SCOP1
                                                MOV     #STACK,SP       ;RESTORE STK PTR

                                                JSR     PC,SUBCLR
                                                ERROR   24              ;CERR AFTER SCLR

                                                MOV     #RHTAB,R0
                                                MOV     #<CFMT!RDHEAD>,RKCS1(R5)        ;READ HEADER CMD
                                                MOV     T50000,TEMP1    ;SETUP  TIMEOUT
                                                JSR     PC,FRDY         ;FIND RDY
                                                ERROR   171             ;NO RDY AFTER READ HEADER CMD
                                                BIT     #CERR,HCS1
                                                BEQ     65$
                                                ERROR   174             ;CERR AFTER READ HEADER CMD
                                                TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
                                                JMP     $EOP            ;ABORT DRIVE

                                        65$:    MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
                                                MOV     RKDB(R5),(R0)+  ;2'ND WORD
                                                MOV     RKDB(R5),(R0)+  ;3'RD WORD


                                                BIT     #DLT,RKCS2(R5)
                                                BEQ     66$
                                                JSR     PC,GSTAT
                                                ERROR   173             ;DLT AFTER READ HEADER CMD
                                                TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
                                                JMP     $EOP            ;ABORT DRIVE
                                        66$:

                                                MOV     #<CFMT!SELDRV>,RKCS1(R5)
                                                MOV     T10,TEMP1
                                                JSR     PC,FRDY         ;FIND RDY
                                                ERROR   117             ;NO RDY AFTER SELDRV CMD
                                                BIT     #D.FORM,HMR2
                                                BNE     6$
                                                ERROR   313             ;FORMAT NOT SET AFTER READ HDR CMD

                                        6$:

                                                MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
                                                CLR     E.B0            ;EXPECTED MSG B0
                                                MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
                                                MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
                                                CLR     E.A2            ;EXPECTED MSG A2
                                                MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
```

```
                                                MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3

023312  004737  044720                        JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
023316  000003                                .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
023320  104301                                ERROR   301             ;MSG A0 ERROR AFTER READ HEADER CMD
023322  104271                                ERROR   271             ;MSG B0 ERROR
023324  104302                                ERROR   302             ;MSG A1 ERROR
023326  104272                                ERROR   272             ;MSG B1 ERROR

023330  005737  001362                        TST     CYLDIF          ;SEE IF MSG A2=0
023334  001401                                BEQ     67$             ;BR IF YES
023336  104172                                ERROR   172             ;MSG A2 NOT CLEARED AFTER READ HEADER CMD
023340  005737  001364            67$:        TST     CYLADD          ;SEE IF MSG B2=0
023344  001401                                BEQ     68$             ;BR IF YES
023346  104264                                ERROR   264             ;MSG B2 NOT CLEARED AFTER READ HEADER CMD
023350                            68$:
023350  012701  001674                        MOV     #RHTAB,R1

023354  005037  001442            3$:         CLR     WDCNT           ;HEADER WORD COUNT
023360  013737  001450  003372                MOV     DATA1,TEMP1     ;GET 'SHOULD BE' DATA
023366  012137  001454            4$:         MOV     (R1)+,HDWD      ;READ HEADER WORD
023372  023737  001454  003372                CMP     HDWD,TEMP1      ;MATCH OK?
023400  001401                                BEQ     5$              ;BR IF YES
023402  104202                                ERROR   202             ;READ HEADER MISMATCH
023404  005237  001442            5$:         INC     WDCNT
023410  023727  001442  000003                CMP     WDCNT,#3        ;JUST 1 SECTOR AND 1 HEAD
023416  001363                                BNE     4$


;;*********************************************************************
;*TEST 26       WRITE & READ HEADERS CYL 0, HEAD 0
;;*********************************************************************
023420  000004            TST26:  SCOPE
023422  012737  000001  001174                MOV     #1,$TIMES       ;;DO 1 ITERATION
023430  012706  001100                        MOV     #STACK,SP       ;RESTORE STK PTR

023434  004737  046106                        JSR     PC,SUBCLR
023440  104024                                ERROR   24              ;CERR AFTER SCLR

023442  005237  001464                        INC     BYPFMT          ;SET BIT 14 & 15  IN HEADER

023446  012765  001470  000004                MOV     #HDTAB,RKBA(R5) ;HEADER WORD TABLE
023454  012765  177676  000002                MOV     #-66.,RKWC(R5)  ;WORD COUNT.
023462  012737  000000  001352                MOV     #0,TOCYL

023470  013737  001352  001366                MOV     TOCYL,CALADD    ;SETUP
023476  012737  000000  001430                MOV     #0,HEAD         ;TO FILL
023504  012737  000000  001436                MOV     #0,FORMAT       ;HEADER
023512  004737  047142                        JSR     PC,FHDTAB       ;TABLE

023516  012765  000000  000020                MOV     #0,RKDC(R5)     ;CYL#

023524  012765  000027  000000                MOV     #<WRHEAD>,RKCS1(R5)     ;WRITE HEADER CMD
023532  013737  001426  003372                MOV     T50000,TEMP1    ;SETUP TIMEOUT
```

```
023640  004737  044176          JSR     PC,FRDY         ;FIND RDY
023644  104200                  ERROR   200             ;NO RDY AFTER WRITE HEADER CMD
023646  004737  045534          JSR     PC,GSTAT        ;GET FRESH STATUS
023652  032737  100000  003334  BIT     #CERR,HCS1
023660  001405                  BEQ     64$
023662  104201                  ERROR   201             ;CERR AFTER WRITE HEADER CMD
023664  104401  056606          TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
023670  000137  043470          JMP     $EOP            ;ABORT DRIVE
023674                  64$:

023674  012737  010340  003424  MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
023702  005037  003426          CLR     E.B0            ;EXPECTED MSG B0
023706  012737  001720  003430  MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
023714  012737  000001  003432  MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
023722  005037  003434          CLR     E.A2            ;EXPECTED MSG A2
023726  012737  000002  003436  MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
023734  012737  000003  003442  MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3

023742  004737  044720          JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
023746  000003                  .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
023650  104277                  ERROR   277             ;MSG A0 ERROR AFTER WRITE HEADER CMD
023652  104267                  ERROR   267             ;MSG B0 ERROR
023654  104300                  ERROR   300             ;MSG A1 ERROR
023656  104270                  ERROR   270             ;MSG B1 ERROR

023660  005037  001400          CLR     SECNT           ;SECTOR COUNT
023664  104415                  SCOP1
023666  012706  001100          MOV     #STACK,SP       ;RESTORE STK PTR

023672  004737  046106          JSR     PC,SUBCLR
023676  104024                  ERROR   24              ;CERR AFTER SCLR

023700  012765  000000  000020  MOV     #0,RKDC(R5)     ;CYL #

023706  012700  001674          MOV     #RHTAB,R0

023712  012765  000025  000000  65$:    MOV     #RDHEAD,RKCS1(R5)       ;READ HEADER CMD
023720  013737  001420  003372  MOV     T500,TEMP1      ;SETUP  TIMEOUT
023726  004737  044176          JSR     PC,FRDY         ;FIND RDY
023732  104171                  ERROR   171             ;NO RDY AFTER READ HEADER CMD
023734  032737  100000  003334  BIT     #CERR,HCS1
023742  001405                  BEQ     66$
023744  104174                  ERROR   174             ;CERR AFTER READ HEADER  CMD
023746  104401  056606          TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
023752  000137  043470          JMP     $EOP            ;ABORT DRIVE

023756  016520  000024  66$:    MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
023762  016520  000024          MOV     RKDB(R5),(R0)+  ;2'ND WORD
023766  016520  000024          MOV     RKDB(R5),(R0)+  ;3'RD WORD

023772  032765  100000  000010  BIT     #DLT,RKCS2(R5)  ;SEE IF DATA LATE
024000  001407                  BEQ     67$
024002  004737  045534          JSR     PC,GSTAT
024006  104173                  ERROR   173             ;DATA LATE ON READ HEADER
024010  104401  056606          TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
024014  000137  043470          JMP     $EOP            ;ABORT DRIVE
```

```
5527
5528  024020  020027  002100          67$:    CMP     R0,#RHTAB+132.  ;ALL 66 WORDS DONE?
5529  024024  001332                          BNE     65$             ;BR IF NO
5530
5531  024026  004737  047464                  JSR     PC,SORT         ;SORT RHTAB INTO SRTTAB SO THAT IT
5532                                                                  ;BEGINS WITH SECTOR 0
5533  024032  005037  001442                  CLR     WDCNT           ;WORD COUNT
5534  024036  012700  002100                  MOV     #SRTTAB,R0      ;ACTUAL HEADER TABLE
5535  024042  012701  001470                  MOV     #HDTAB,R1       ;CALC HEADER TABLE
5536
5537  024046  012037  001454          68$:    MOV     (R0)+,HDWD
5538  024052  012137  003372                  MOV     (R1)+,TEMP1
5539  024056  023737  001454  003372          CMP     HDWD,TEMP1      ;COMPARE ACTUAL WITH CALCULATED WORD
5540  024064  001401                          BEQ     69$             ;BR IF COMPARE
5541  024066  104202                          ERROR   202             ;READ HEADER MISMATCH
5542
5543  024070  005237  001442          69$:    INC     WDCNT
5544  024074  023727  001442  000102          CMP     WDCNT,#66.      ;ALL WORDS DONE?
5545  024102  001361                          BNE     68$             ;BR IF NO
5546
5547
5548  024104  005037  001464                  CLR BYPFMT              ;ALLOW CORRECT FORMATTING
5549
5550
5551
```

```
                        ;;*****************************************************************
                        ;*TEST 27       SEEK FROM CYL 0 TO 1 & READ HEADERS
                        ;*
                        ;*      THIS TEST CHECKS MSG A & B WORDS 0,1,2 FOR CORRECT STATUS AFTER RDY
                        ;*      IS RECEIVED FROM A SEEK CMD TO DETERMINE
                        ;*      THAT THE HEADS ARE ACTUALLY MOVING & THE CYL DIFF IS 1.
                        ;*      AFTER ATTN IS RECEIVED, CERR IS EXAMINED FOR ANY ERRORS.
                        ;*      CYL DIFFERENCE IN MSG A2 IS VERIFIED TO BE 0 & CYL ADDR
                        ;*      IN MSG B2 IS VERIFIED TO BE 1.
                        ;*
                        ;*      HEADERS ARE READ FROM 1 SECTOR, HEAD 0 & VERIFIED THAT THEY ARE
                        ;*      DIFFERENT FROM CYL 0 TO SHOW THAT THE HEADS DID ACTUALLY MOVE.
                        ;*
                        ;;*****************************************************************
024110  000004         TST27:  SCOPE
024112  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
024120  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
024124  004737  046106                  JSR     PC,SUBCLR
024130  104024                          ERROR   24              ;CERR AFTER SCLR
024132  005037  001350                  CLR     FRCYL
024136  012737  000001  001352          MOV     #1,TOCYL
024144  012737  000001  001360          MOV     #1,CALDIF
024152  012765  000001  000020          MOV     #1,RKDC(R5)     ;SET FOR CYL 1
024160  012737  025160  001176          MOV     #10$,$ESCAPE

024166  012765  000017  000000          MOV     #SEEK,RKCS1(R5) ;SEEK CMD
024174  013737  001414  003372          MOV     T10,TEMP1       ;SETUP  TIMEOUT
024202  004737  044176                  JSR     PC,FRDY         ;FIND RDY
024206  104131                          ERROR   131             ;NO RDY AFTER SEEK CMD
024210  012737  030140  003424          MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
024216  005037  003426                  CLR     E.B0
024222  012737  003720  003430          MOV     #<D.FWD!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
024230  012737  000001  003432          MOV     #1,E.B1

024236  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
024242  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
024244  104203                          ERROR   203             ;MSG A0 ERROR DURING SEEK CMD
024246  104204                          ERROR   204             ;MSG B0 ERROR
024250  104205                          ERROR   205             ;MSG A1 ERROR
024252  104206                          ERROR   206             ;MSG B1 ERROR

024254  023727  001362  000001          CMP     CYLDIF,#1
024262  001401                          BEQ     1$
024264  104212                          ERROR   212             ;CYL DIFF INCORRECT DURING SEEK CMD.


024266  012737  025200  001176  1$:     MOV     #12$,$ESCAPE
024274  013737  001422  003372          MOV     T2500,TEMP1     ;SETUP TIMEOUT
```

```
                                                
024302  004737  044606                  JSR     PC,FATT2        ;FIND ATTN
024306  104132                          ERROR   132             ;NO ATTN AFTER SEEK CMD
024310  032737  100000  003334          BIT     #CERR,HCS1
024316  001401                          BEQ     64$
024320  104210                          ERROR   210             ;CERR AFTER SEEK CMD
024322                          64$:
                                                
024322  012737  050340  003424          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
024330  005037  003426                  CLR     E.B0            ;EXPECTED MSG B0
024334  012737  001720  003430          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
024342  012737  000001  003432          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
024350  005037  003434                  CLR     E.A2            ;EXPECTED MSG A2
024354  012737  000002  003436          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
024362  012737  000003  003442          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
                                                
024370  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
024374  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
024376  104133                          ERROR   133             ;MSG A0 ERROR AFTER SEEK CMD
024400  104134                          ERROR   134             ;MSG B0 ERROR
024402  104135                          ERROR   135             ;MSG A1 ERROR
024404  104136                          ERROR   136             ;MSG B1 ERROR
024406  005737  001362                  TST     CYLDIF
024412  001401                          BEQ     65$
024414  104137                          ERROR   137             ;CYL DIFF NOT CLEARED AFTER SEEK CMD
                                                
024416                          65$:
                                                
024416  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
024424  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
024432  012765  000005  000000          MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
024440  013737  001414  003372          MOV     T10,TEMP1
024446  004737  044176                  JSR     PC,FRDY         ;FIND RDY
024452  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
024454  004737  044460                  JSR     PC,TSTATN       ;TEST FOR ATTN
024460  000401                          BR      66$
024462  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
024464                          66$:
                                                
024464  012737  010340  003424          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
024472  005037  003426                  CLR     E.B0            ;EXPECTED MSG B0
024476  012737  001720  003430          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
024504  012737  000001  003432          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
024512  005037  003434                  CLR     E.A2            ;EXPECTED MSG A2
024516  012737  000002  003436          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
024524  012737  000003  003442          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
                                                
024532  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
024536  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
024540  104273                          ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
024542  104265                          ERROR   265             ;MSG B0 ERROR
024544  104274                          ERROR   274             ;MSG A1 ERROR
024546  104266                          ERROR   266             ;MSG B1 ERROR
                                                
024550  005737  001364                  TST     CYLADD
024554  023727  001364  000001          CMP     CYLADD,#1
```

```
5664  024562  001401                          BEQ     2$
5665  024564  104207                          ERROR   207             ;CYL ADDR INCORRECT AFTER SEEK CMD
5666
5667
5668  024566                          2$:
5669  024566  104415                          SCOP1
5670  024570  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
5671
5672  024574  004737  045106                  JSR     PC,SUBCLR
5673  024600  104024                          ERROR   24              ;CERR AFTER SCLR
5674
5675  024602  005037  001176                  CLR     $ESCAPE
5676  024606  012765  000001  000020          MOV     #1,RKDC(R5)     ;CYL #
5677
5678  024614  012700  001674                  MOV     #RHTAB,R0
5679  024620  012765  000025  000000          MOV     #<RDHEAD>,RKCS1(R5)     ;READ HEADER CMD
5680  024626  013737  001426  003372          MOV     T50000,TEMP1    ;SETUP  TIMEOUT
5681  024634  004737  044176                  JSR     PC,FRDY         ;FIND RDY
5682  024640  104171                          ERROR   171             ;NO RDY AFTER READ HEADER CMD
5683  024642  032737  100000  003334          BIT     #CERR,HCS1
5684  024650  001405                          BEQ     67$
5685  024652  104174                          ERROR   174             ;CERR AFTER READ HEADER CMD
5686  024654  104401  056606                  TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
5687  024660  000137  043470                  JMP     $EOP            ;ABORT DRIVE
5688
5689  024664  016520  000024          67$:    MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
5690  024670  016520  000024                  MOV     RKDB(R5),(R0)+  ;2'ND WORD
5691  024674  016520  000024                  MOV     RKDB(R5),(R0)+  ;3'RD WORD
5692
5693
5694  024700  032765  100000  000010          BIT     #DLT,RKCS2(R5)
5695  024706  001407                          BEQ     68$
5696  024710  004737  045534                  JSR     PC,GSTAT
5697  024714  104173                          ERROR   173             ;DLT AFTER READ HEADER CMD
5698  024716  104401  056606                  TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
5699  024722  000137  043470                  JMP     $EOP            ;ABORT DRIVE
5700  024726                          68$:
5701
5702
5703  024726  005737  001674                  TST     RHTAB           ;CHECK 1'ST WORD ONLY:CYL#
5704  024732  001001                          BNE     3$
5705  024734  104211                          ERROR   211             ;CYL 0 HEADER ON CYL 1
5706
5707  024736  023727  001674  000001  3$:     CMP     RHTAB,#1
5708  024744  001401                          BEQ     4$
5709  024746  104202                          ERROR   202             ;READ CYL WORD HEADER ERROR
5710  024750                          4$:
5711  024750  004737  050036                  JSR     PC,SWTST        ;SEE IF SW 14 OR 8 IS SET
5712  024754  000521                          BR      TST30           ;;GO TO NEXT TEST
5713                                                                  ;RETURN HERE IF SW 14 IS SET OR
5714                                                                  ;SW 8 WITH SWR <7:0> APPLY
5715  024756  004737  046106          6$:     JSR     PC,SUBCLR
5716  024762  104024                          ERROR   24              ;CERR AFTER SCLR
5717
5718  024764  012765  000017  000000          MOV     #SEEK,RKCS1(R5) ;SEEK CMD TO RECONDITION DRIVE.
5719  024772  013737  001414  003372          MOV     T10,TEMP1       ;SETUP TIMEOUT
```

```
5720  025000  004737  044176          JSR     PC,FRDY         ;FIND RDY
5721  025004  104131                  ERROR   131             ;NO RDY AFTER SEEK CMD.
5722
5723  025006  013737  001424  003372  MOV     T5000,TEMP1
5724  025014  004737  044606          JSR     PC,FATT2        ;FIND ATTN
5725  025020  104132                  ERROR   132             ;NO ATTN AFTER SEEK CMD
5726  025022  032737  100000  003334  BIT     #CERR,HCS1
5727  025030  001401                  BEQ     69$
5728  025032  104210                  ERROR   210             ;CERR AFTER SEEK CMD.
5729
5730  025034  004737  046106  69$:    JSR     PC,SUBCLR
5731  025040  104024                  ERROR   24              ;CERR AFTER SCLR
5732
5733
5734  025042  012737  050340  003424  MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
5735  025050  005037  003426          CLR     E.B0            ;EXPECTED MSG B0
5736  025054  012737  001720  003430  MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
5737  025062  012737  000001  003432  MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
5738  025070  005037  003434          CLR     E.A2            ;EXPECTED MSG A2
5739  025074  012737  000002  003436  MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
5740  025102  012737  000003  003442  MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
5741
5742  025110  004737  044720          JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
5743  025114  000003                  .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
5744  025116  104133                  ERROR   133             ;MSG A0 ERROR AFTER SEEK CMD
5745  025120  104134                  ERROR   134             ;MSG B0 ERROR
5746  025122  104135                  ERROR   135             ;MSG A1 ERROR
5747  025124  104136                  ERROR   136             ;MSG B1 ERROR
5748  025126  005737  001364          TST     CYLADD
5749  025132  001401                  BEQ     7$
5750  025134  104043                  ERROR   43              ;CYL ADDR IN RKMR3 NOT=RKDC
5751
5752  025136                  7$:
5753  025136  005037  001176          CLR     $ESCAPE
5754  025142  005737  001410          TST     LPFLG
5755  025146  001402                  BEQ     70$
5756  025150  000177  153734          JMP     @$LPERR         ;SW 9 WAS SET.
5757  025154  000177  153726  70$:    JMP     @$LPADR         ;SW 14 OR 8 WAS SET
5758
5759  025160                  10$:
5760  025160  005237  001410          INC     LPFLG
5761  025164  032777  001000  153746  BIT     #SW9,@SWR       ;LOOP ON ERROR?
5762  025172  001271                  BNE     6$              ;YES, RECONDITION DRIVE
5763  025174  000137  024266          JMP     1$              ;RETURN TO MAINLINE
5764  025200                  12$:
5765  025200  005237  001410          INC     LPFLG
5766  025204  032777  001000  153726  BIT     #SW9,@SWR       ;LOOP ON ERROR?
5767  025212  001261                  BNE     6$              ;YES, RECONDITION DRIVE
5768  025214  000137  024566          JMP     2$              ;RETURN TO MAINLINE
5769
5770
5771
5772
5773                    ;;**********************************************************
5774                    ;*TEST 30       WRITE & READ HEADERS CYL 1, HEAD 0
5775                    ;;**********************************************************
```

```
5776  025220  000004                    TST30:  SCOPE
5777  025222  012737  000001  001174            MOV     #1,$TIMES       ;;DO 1 ITERATION
5778  025230  012706  001100                    MOV     #STACK,SP       ;RESTORE STK PTR
5779
5780  025234  004737  046106                    JSR     PC,SUBCLR
5781  025240  104024                            ERROR   24              ;CERR AFTER SCLR
5782
5783  025242  005237  001464                    INC     BYPFMT          ;SET BIT 14 & 15  IN HEADER
5784
5785  025246  012765  001470  000004            MOV     #HDTAB,RKBA(R5) ;HEADER WORD TABLE
5786  025254  012765  177676  000002            MOV     #-66.,RKWC(R5)  ;WORD COUNT.
5787  025262  012737  000001  001352            MOV     #1,TOCYL
5788
5789  025270  013737  001352  001366            MOV     TOCYL,CALADD    ;SETUP
5790  025276  012737  000000  001430            MOV     #0,HEAD         ;TO FILL
5791  025304  012737  000000  001436            MOV     #0,FORMAT       ;HEADER
5792  025312  004737  047142                    JSR     PC,FHDTAB       ;TABLE
5793
5794  025316  012765  000001  000020            MOV     #1,RKDC(R5)     ;CYL#
5795
5796  025324  012765  000027  000000            MOV     #<WRHEAD>,RKCS1(R5)     ;WRITE HEADER CMD
5797  025332  013737  001426  003372            MOV     T50000,TEMP1    ;SETUP TIMEOUT
5798  025340  004737  044176                    JSR     PC,FRDY         ;FIND RDY
5799  025344  104200                            ERROR   200             ;NO RDY AFTER WRITE HEADER CMD
5800  025346  004737  045534                    JSR     PC,GSTAT        ;GET FRESH STATUS
5801  025352  032737  100000  003334            BIT     #CERR,HCS1
5802  025360  001405                            BEQ     64$
5803  025362  104201                            ERROR   201             ;CERR AFTER WRITE HEADER CMD
5804  025364  104401  056606                    TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
5805  025370  000137  043470                    JMP     $EOP            ;ABORT DRIVE
5806  025374                            64$:
5807
5808  025374  012737  010340  003424            MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
5809  025402  005037  003426                    CLR     E.B0            ;EXPECTED MSG B0
5810  025406  012737  001720  003430            MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
5811  025414  012737  000001  003432            MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
5812  025422  005037  003434                    CLR     E.A2            ;EXPECTED MSG A2
5813  025426  012737  000002  003436            MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
5814  025434  012737  000003  003442            MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
5815
5816  025442  004737  044720                    JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
5817  025446  000003                            .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
5818  025450  104277                            ERROR   277             ;MSG A0 ERROR AFTER WRITE HEADER CMD
5819  025452  104267                            ERROR   267             ;MSG B0 ERROR
5820  025454  104300                            ERROR   300             ;MSG A1 ERROR
5821  025456  104270                            ERROR   270             ;MSG B1 ERROR
5822
5823  025460  005037  001400                    CLR     SECNT           ;SECTOR COUNT
5824  025464  104415                            SCOP1
5825  025466  012706  001100                    MOV     #STACK,SP       ;RESTORE STK PTR
5826
5827  025472  004737  046106                    JSR     PC,SUBCLR
5828  025476  104024                            ERROR   24              ;CERR AFTER SCLR
5829
5830  025500  012765  000001  000020            MOV     #1,RKDC(R5)     ;CYL #
5831
```

```
5832  025506  012700  001674          MOV     #RHTAB,R0
5833
5834  025512  012765  000025  000000  65$:    MOV     #RDHEAD,RKCS1(R5)       ;READ HEADER CMD
5835  025520  013737  001420  003372          MOV     T500,TEMP1              ;SETUP  TIMEOUT
5836  025526  004737  044176                  JSR     PC,FRDY                 ;FIND RDY
5837  025532  104171                          ERROR   171                     ;NO RDY AFTER READ HEADER CMD
5838  025534  032737  100000  003334          BIT     #CERR,HCS1
5839  025542  001405                          BEQ     66$
5840  025544  104174                          ERROR   174                     ;CERR AFTER READ HEADER  CMD
5841  025546  104401  056606                  TYPE    ,MSG18                  ;ABORTING BALANCE OF TESTS
5842  025552  000137  043470                  JMP     $EOP                    ;ABORT DRIVE
5843
5844  025556  016520  000024          66$:    MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
5845  025562  016520  000024                  MOV     RKDB(R5),(R0)+  ;2'ND WORD
5846  025566  016520  000024                  MOV     RKDB(R5),(R0)+  ;3'RD WORD
5847
5848  025572  032765  100000  000010          BIT     #DLT,RKCS2(R5)  ;SEE IF DATA LATE
5849  025600  001407                          BEQ     67$
5850  025602  004737  045534                  JSR     PC,GSTAT
5851  025606  104173                          ERROR   173                     ;DATA LATE ON READ HEADER
5852  025610  104401  056606                  TYPE    ,MSG18                  ;ABORT BALANCE OF TESTS
5853  025614  000137  043470                  JMP     $EOP                    ;ABORT DRIVE
5854
5855  025620  020027  002100          67$:    CMP     R0,#RHTAB+132.  ;ALL 66 WORDS DONE?
5856  025624  001332                          BNE     65$             ;BR IF NO
5857
5858  025626  004737  047464                  JSR     PC,SORT                 ;SORT RHTAB INTO SRTTAB SO THAT IT
5859                                                                  ;BEGINS WITH SECTOR 0
5860  025632  005037  001442                  CLR     WDCNT                   ;WORD COUNT
5861  025636  012700  002100                  MOV     #SRTTAB,R0              ;ACTUAL HEADER TABLE
5862  025642  012701  001470                  MOV     #HDTAB,R1               ;CALC HEADER TABLE
5863
5864  025646  012037  001454          68$:    MOV     (R0)+,HDWD
5865  025652  012137  003372                  MOV     (R1)+,TEMP1
5866  025656  023737  001454  003372          CMP     HDWD,TEMP1              ;COMPARE ACTUAL WITH CALCULATED WORD
5867  025664  001401                          BEQ     69$                     ;BR IF COMPARE
5868  025666  104202                          ERROR   202                     ;READ HEADER MISMATCH
5869
5870  025670  005237  001442          69$:    INC     WDCNT
5871  025674  023727  001442  000102          CMP     WDCNT,#66.              ;ALL WORDS DONE?
5872  025702  001361                          BNE     68$                     ;BR IF NO
5873
5874
5875  025704  005037  001464                  CLR BYPFMT                      ;ALLOW CORRECT FORMATTING
5876
5877
5878
5879                                  ;;*****************************************************************
5880                                  ;*TEST 31       TEST RECALIBRATE CMD & READ HEADERS
5881                                  ;*
5882                                  ;*      THIS TEST DOES A RECALIBRATE & READS HEADERS.
5883                                  ;*      IT VERIFIES THAT WRITING HEADERS ON CYL 1 FROM THE PREVIOUS
5884                                  ;*      TEST DID NOT OVERWRITE CYL 0 HEADERS.
5885                                  ;*      AN ERROR IN THIS TEST INDICATES THAT HEADS:
5886                                  ;*
5887                                  ;*
```

```
                                        ;*              A. MOVED TO A CYL OTHER THAN 1
                                        ;*      OR      B. DID NOT GET BACK TO CYL 0
                                        ;*
                                        ;;*****************************************************************
025710  000004                  TST31:  SCOPE
025712  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
025720  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
                                
025724  004737  046106                  JSR     PC,SUBCLR
025730  104024                          ERROR   24              ;CERR AFTER SCLR
025732  012737  000001  001350          MOV     #1,FRCYL        ;PARAMETERS
025740  005037  001352                  CLR     TOCYL           ;FOR
025744  012737  000001  001360          MOV     #1,CALDIF       ;ERROR TYPEOUTS
025752  012737  026776  001176          MOV     #10$,$ESCAPE
025760  012765  000013  000000          MOV     #RECAL,RKCS1(R5)        ;RECAL CMD
025766  013737  001414  003372          MOV     T10,TEMP1       ;SETUP TIMEOUT
025774  004737  044176                  JSR     PC,FRDY         ;FIND RDY
026000  104124                          ERROR   124             ;NO RDY AFTER RECAL CMD
026002  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
026010  012765  000001  000026          MOV     #1,RKMR1(R5)    ;SELECT WORD 1
026016  004737  045534                  JSR     PC,GSTAT
026022  032737  020000  003362          BIT     #D.RTZ,HMR2
026030  001001                          BNE     1$
026032  104307                          ERROR   307             ;RTZ NOT SET DURING RECAL CMD
                                
026034  012737  030140  003424  1$:     MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
026042  005037  003426                  CLR     E.B0
026046  012737  025720  003430          MOV     #<D.RTZ!D.REV!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
026054  012737  000001  003432          MOV     #1,E.B1
                                
026062  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
026066  000001                          .WORD   T.A2!0!0                ;& MSGS SPECIFIED HERE
026070  104213                          ERROR   213             ;MSG A0 ERROR DURING RECAL CMD
026072  104214                          ERROR   214             ;MSG B0 ERROR
026074  104215                          ERROR   215             ;MSG A1 ERROR
026076  104216                          ERROR   216             ;MSG B1 ERROR
026100  005737  001362                  TST     CYLDIF
026104  001401                          BEQ     2$
026106  104217                          ERROR   217             ;CYL DIFF INCORRECT DURING RECAL CMD.
                                
026110  012737  027016  001176  2$:     MOV     #12$,$ESCAPE
026116  012737  177777  003372          MOV     #-1,TEMP1       ;SETUP TIMEOUT
026124  004737  044606                  JSR     PC,FATT2        ;FIND ATTN
026130  104055                          ERROR   55              ;NO ATTN AFTER RECAL CMD
026132  032737  100000  003334          BIT     #CERR,HCS1
026140  001401                          BEQ     3$
026142  104220                          ERROR   220             ;CERR AFTER RECAL CMD
026144                          3$:
                                
026144  012737  050340  003424          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
026152  005037  003426                  CLR     E.B0            ;EXPECTED MSG B0
026156  012737  001720  003430          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
026164  012737  000001  003432          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
026172  005037  003434                  CLR     E.A2            ;EXPECTED MSG A2
026176  012737  000002  003436          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
026204  012737  000003  003442          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
```

```
5944
5945  026212  004737  044720          JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
5946  026216  000003                  .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
5947  026220  104221                  ERROR   221             ;MSG A0 ERROR AFTER RECAL CMD
5948  026222  104275                  ERROR   275             ;MSG B0 ERROR
5949  026224  104222                  ERROR   222             ;MSG A1 ERROR
5950  026226  104276                  ERROR   276             ;MSG B1 ERROR
5951
5952  026230  005737  001362          TST     CYLDIF          ;SEE IF MSG A2=0
5953  026234  001401                  BEQ     64$             ;BR IF YES
5954  026236  104047                  ERROR   47              ;MSG A2 NOT CLEARED AFTER RECAL CMD
5955  026240  005737  001364  64$:    TST     CYLADD          ;SEE IF MSG B2=0
5956  026244  001401                  BEQ     65$             ;BR IF YES
5957  026246  104050                  ERROR   50              ;MSG B2 NOT CLEARED AFTER RECAL CMD
5958  026250                  65$:
5959
5960  026250  012765  100000  000000  MOV     #CCLR,RKCS1(R5)
5961  026256  013765  001222  000010  MOV     $UNIT,RKCS2(R5) ;DRIVE#
5962  026264  012765  000005  000000  MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
5963  026272  013737  001414  003372  MOV     T10,TEMP1
5964  026300  004737  044176          JSR     PC,FRDY         ;FIND RDY
5965  026304  104151                  ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
5966  026306  004737  044460          JSR     PC,TSTATN       ;TEST FOR ATTN
5967  026312  000401                  BR      66$
5968  026314  104154                  ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
5969  026316                  66$:
5970
5971  026316  012737  010340  003424  MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
5972  026324  005037  003426          CLR     E.B0            ;EXPECTED MSG B0
5973  026330  012737  001720  003430  MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
5974  026336  012737  000001  003432  MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
5975  026344  005037  003434          CLR     E.A2            ;EXPECTED MSG A2
5976  026350  012737  000002  003436  MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
5977  026356  012737  000003  003442  MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
5978
5979  026364  004737  044720          JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
5980  026370  000003                  .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
5981  026372  104273                  ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
5982  026374  104265                  ERROR   265             ;MSG B0 ERROR
5983  026376  104274                  ERROR   274             ;MSG A1 ERROR
5984  026400  104266                  ERROR   266             ;MSG B1 ERROR
5985
5986  026402  004737  046106  4$:     JSR     PC,SUBCLR
5987  026406  104024                  ERROR   24              ;CERR AFTER SCLR
5988
5989  026410  005037  001176          CLR     $ESCAPE
5990
5991  026414  012700  001674          MOV     #RHTAB,R0
5992  026420  012765  000025  000000  MOV     #<RDHEAD>,RKCS1(R5)     ;READ HEADER CMD
5993  026426  013737  001426  003372  MOV     T50000,TEMP1    ;SETUP  TIMEOUT
5994  026434  004737  044176          JSR     PC,FRDY         ;FIND RDY
5995  026440  104171                  ERROR   171             ;NO RDY AFTER READ HEADER CMD
5996  026442  032737  100000  003334  BIT     #CERR,HCS1
5997  026450  001405                  BEQ     67$
5998  026452  104174                  ERROR   174             ;CERR AFTER READ HEADER CMD
5999  026454  104401  056606          TYPE    .MSG18          ;ABORT BALANCE OF TESTS
```

```
 6000  026460  000137  043470                 JMP     $EOP            ;ABORT DRIVE
 6001
 6002  026464  016520  000024        67$:     MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
 6003  026470  016520  000024                 MOV     RKDB(R5),(R0)+  ;2'ND WORD
 6004  026474  016520  000024                 MOV     RKDB(R5),(R0)+  ;3'RD WORD
 6005
 6006
 6007  026500  032765  100000  000010         BIT     #DLT,RKCS2(R5)
 6008  026506  001401                         BEQ     68$
 6009  026510  004737  045534                 JSR     PC,GSTAT
 6010  026514  104173                         ERROR   173             ;DLT AFTER READ HEADER AND
 6011  026516  124401  056606                 TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
 6012  026522  000137  043470                 JMP     $EOP            ;ABORT DRIVE
 6013  026526                         68$:
 6014
 6015  026526  023727  001674  000001         CMP     RHTAB,#1        ;CHECK WORD 0, CYL # ONLY
 6016  026534  001401                         BNE     5$
 6017  026536  104240                         ERROR   240             ;CYL 1 HEADERS ON CYL 0
 6018
 6019  026540  005737  001674          5$:    TST     RHTAB
 6020  026544  001401                         BEQ     6$
 6021  026546  104202                         ERROR   202             ;READ CYL WORD HEADER ERROR
 6022  026550                         6$:
 6023  026550  004737  050036                 JSR     PC,SWTST        ;SEE IF SW 14 OR 8 IS SET
 6024  026554  000530                         BR      TST32           ;;GO TO NEXT TEST
 6025                                                                 ;RETURN HERE IF SW 14 IS SET OR
 6026                                                                 ;SW 8 WITH SWR <7:0> APPLY
 6027  026556  004737  046106          8$:    JSR     PC,SUBCLR
 6028  026562  104024                         ERROR   24              ;CERR AFTER SCLR
 6029  026564  012765  000001  000020         MOV     #1,RKDC(R5)     ;RECONDITION BACK TO CYL 1
 6030
 6031  026572  012765  000017  000000         MOV     #SEEK,RKCS1(R5) ;SEEK CMD TO RECONDITION DRIVE.
 6032  026600  013737  001414  003372         MOV     T10,TEMP1       ;SETUP TIMEOUT
 6033  026606  004737  044176                 JSR     PC,FRDY         ;FIND RDY
 6034  026612  104131                         ERROR   131             ;NO RDY AFTER SEEK CMD.
 6035
 6036  026614  013737  001424  003372         MOV     T5000,TEMP1
 6037  026622  004737  044606                 JSR     PC,FATT2        ;FIND ATTN
 6038  026626  104132                         ERROR   132             ;NO ATTN AFTER SEEK CMD
 6039  026630  032737  100000  003334         BIT     #CERR,HCS1
 6040  026636  001401                         BEQ     69$
 6041  026640  104210                         ERROR   210             ;CERR AFTER SEEK CMD.
 6042
 6043  026642  004737  046106          69$:   JSR     PC,SUBCLR
 6044  026646  104024                         ERROR   24              ;CERR AFTER SCLR
 6045
 6046
 6047
 6048  026650  012737  010340  003424         MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
 6049  026656  005037  003426                 CLR     E.B0            ;EXPECTED MSG B0
 6050  026662  012737  001720  003430         MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
 6051  026670  012737  000001  003432         MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
 6052  026676  005037  003434                 CLR     E.A2            ;EXPECTED MSG A2
 6053  026702  012737  000002  003436         MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
 6054  026710  012737  000003  003442         MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
 6055  026716  012737  000022  003436         MOV     #<BIT4!2>,E.B2  ;EXPECTED MSG B2 & ID FOR CYL 1
```

```
                        JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
                        .WORD   T.A2!T.B2!C             ;& MSGS SPECIFIED HERE
                        ERROR   133             ;MSG A0 ERROR AFTER SEEK CMD
                        ERROR   134             ;MSG B0 ERROR
                        ERROR   135             ;MSG A1 ERROR
                        ERROR   136             ;MSG B1 ERROR
                        CMP     CYLADD,#1
                        BEQ     9$
                        ERROR   43              ;CYL ADDR IN RKMR3 NOT=RKDC
                9$:
                        CLR     $ESCAPE
                        TST     LPFLG
                        BEQ     70$
                        JMP     @$LPERR         ;SW 9 WAS SET.
                70$:    JMP     @$LPADR         ;SW 14 OR 8 WAS SET
                10$:
                        INC     LPFLG
                        BIT     #SW9,@SWR       ;LOOP ON ERROR?
                        BNE     8$              ;YES, RECONDITION DRIVE
                        JMP     2$              ;RETURN TO MAINLINE
                12$:
                        INC     LPFLG
                        BIT     #SW9,@SWR       ;LOOP ON ERROR?
                        BNE     8$              ;YES, RECONDITION DRIVE
                        JMP     4$              ;RETURN TO MAINLINE
                ;;*****************************************************************
                ;;TEST 32        SINGLE INCREMENT SEEKS TO CYL 410
                ;*
                ;*      THIS TEST DOES SINGLE INCREMENT SEEKS OUT TO CYL 410
                ;*      WITHOUT ANY WRITING OR READING SO AS NOT TO INADVERTENTLY
                ;*      DESTROY DATA.
                ;*
                ;;*****************************************************************
027036  000004  TST32:  SCOPE
027040  012737  000001  001174      MOV     #1,$TIMES       ;;DO 1 ITERATION
027046  012706  001100              MOV     #STACK,SP       ;RESTORE STK PTR

027052  004737  046106              JSR     PC,SUBCLR
027056  104024                      ERROR   24              ;CERR AFTER SCLR
027060  005037  001350              CLR     FRCYL           ;FROM CYL
027064  012737  000031  001352      MOV     #1,TOCYL        ;TO CYL
027072  012737  000001  001360      MOV     #1,CALDIF       ;CALCULATED DIFF.

027100                      1$:
027100  104415                      SCOP1
027102  012706  001100              MOV     #STACK,SP       ;RESTORE STK PTR

027106  004737  046106              JSR     PC,SUBCLR
027112  104024                      ERROR   24              ;CERR AFTER SCLR

027114  012737  027720  001176      MOV     #10$,$ESCAPE
027122  013765  001352  000020      MOV     TOCYL,RKDC(R5)  ;CYL TO SEEK TO

027130  012765  000017  000000      MOV     #SEEK,RKCS1(R5) ;SEEK CMD
027136  013737  001414  003372      MOV     T10,TEMP1       ;SETUP  TIMEOUT
```

```
6112  027144  004737  044176                JSR     PC,FRDY         ;FIND RDY
6113  027150  104131                        ERROR   131             ;NO RDY AFTER SEEK CMD
6114  027152  012737  030140  003424        MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
6115  027160  005037  003426                CLR     E.B0
6116  027164  012737  003720  003430        MOV     #<D.FWD!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
6117  027172  012737  000001  003432        MOV     #1,E.B1
6118
6119  027200  004737  044720                JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
6120  027204  000003                        .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
6121  027206  104203                        ERROR   203             ;MSG A0 ERROR DURING SEEK CMD
6122  027210  104204                        ERROR   204             ;MSG B0 ERROR
6123  027212  104205                        ERROR   205             ;MSG A1 ERROR
6124  027214  104206                        ERROR   206             ;MSG B1 ERROR
6125
6126  027216  023727  001362  000001        CMP     CYLDIF,#1
6127  027224  001401                        BEQ     2$
6128  027226  104212                        ERROR   212             ;CYL DIFF INCORRECT DURING SEEK
6129
6130  027230  012737  027740  001176  2$:   MOV     #12$,$ESCAPE
6131  027236  013737  001422  003372        MOV     T2500,TEMP1     ;SETUP TIMEOUT
6132
6133  027244  004737  044606                JSR     PC,FATT2        ;FIND ATTN
6134  027250  104132                        ERROR   132             ;NO ATTN AFTER SEEK CMD
6135  027252  032737  100000  003334        BIT     #CERR,HCS1
6136  027260  001401                        BEQ     64$
6137  027262  104210                        ERROR   210             ;CERR AFTER SEEK CMD
6138  027264                        64$:
6139
6140  027264  012737  050340  003424        MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
6141  027272  005037  003426                CLR     E.B0            ;EXPECTED MSG B0
6142  027276  012737  001720  003430        MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
6143  027304  012737  000001  003432        MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
6144  027312  005037  003434                CLR     E.A2            ;EXPECTED MSG A2
6145  027316  012737  000002  003436        MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
6146  027324  012737  000003  003442        MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
6147
6148  027332  004737  044720                JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
6149  027336  000003                        .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
6150  027340  104133                        ERROR   133             ;MSG A0 ERROR AFTER SEEK CMD
6151  027342  104134                        ERROR   134             ;MSG B0 ERROR
6152  027344  104135                        ERROR   135             ;MSG A1 ERROR
6153  027346  104136                        ERROR   136             ;MSG B1 ERROR
6154  027350  005737  001362                TST     CYLDIF
6155  027354  001401                        BEQ     65$
6156  027356  104137                        ERROR   137             ;CYL DIFF NOT CLEARED AFTER SEEK CMD
6157
6158  027360                        65$:
6159
6160  027360  012765  100000  000000        MOV     #CCLR,RKCS1(R5)
6161  027366  013765  001222  000010        MOV     $UNIT,RKCS2(R5) ;DRIVE#
6162  027374  012765  000005  000000        MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
6163  027402  013737  001414  003372        MOV     T10,TEMP1
6164  027410  004737  044176                JSR     PC,FRDY         ;FIND RDY
6165  027414  104151                        ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
6166  027416  004737  044460                JSR     PC,TSTATN       ;TEST FOR ATTN
6167  027422  000401                        BR      66$
```

```
                                        ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
                                66$:
                                        MOV     #<D.IDON!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
                                        CLR     E.B0            ;EXPECTED MSG B0
                                        MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1      ;EXPECTED A1
                                        MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
                                        CLR     E.A2            ;EXPECTED MSG A2
                                        MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
                                        MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3

                                        JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
                                        .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
                                        ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
                                        ERROR   265             ;MSG B0 ERROR
                                        ERROR   274             ;MSG A1 ERROR
                                        ERROR   266             ;MSG B1 ERROR

                                        CMP     CYLADD,TOCYL
                                        BEQ     3$
                                        ERROR   207             ;CYL ADDR IN RKMR2 NOT=RKDC

                                3$:     CMP     TOCYL,#410.     ;ALL CYL DONE?
                                        BEQ     4$              ;BR IF YES
                                        INC     FRCYL           ;ELSE DO ANOTHER
                                        INC     TOCYL
                                        BEQ     4$              ;BR IF YES
                                        JMP     1$

                                4$:
                                        JSR     PC,SWTST        ;SEE IF SW 14 OR 8 IS SET
                                        BR      TST33           ;;GO TO NEXT TEST
                                                                ;RETURN HERE IF SW 14 IS SET OR
                                                                ;SW 8 WITH SWR <7:0> APPLY


                                6$:

                                        JSR     PC,SUBCLR
                                        ERROR   24              ;CERR AFTER SCRL

                                67$:    MOV     TOCYL,RKDC(R5)  ;CYL#

                                        MOV     #SEEK,RKCS1(R5) ;SEEK CMD TO RECONDITION DRIVE.
                                        MOV     T10,TEMP1       ;SETUP TIMEOUT
                                        JSR     PC,FRDY         ;FIND RDY
                                        ERROR   131             ;NO RDY AFTER SEEK CMD.

                                        MOV     T5000,TEMP1
                                        JSR     PC,FATT2        ;FIND ATTN
                                        ERROR   132             ;NO ATTN AFTER SEEK CMD
                                        BIT     #CERR,HCS1
                                        BEQ     69$
                                        ERROR   210             ;CERR AFTER SEEK CMD.
```

```
6224  027644  004737  046106          69$:    JSR     PC,SUBCLR
6225  027650  104024                          ERROR   24              ;CERR AFTER SCLR
6226
6227  027652  023727  001352  000000          CMP     TOCYL,#0        ;ALL CYL DONE?
6228  027660  001403                          BEQ     68$             ;BR IF YES
6229  027662  005337  001352                  DEC     TOCYL           ;ELSE DO ANOTHER
6230  027666  000737                          BR      67$
6231
6232  027670  004737  046106          68$:    JSR     PC,SUBCLR
6233  027674  104024                          ERROR   24              ;CERR AFTER SCLR
6234
6235  027676  005037  001176                  CLR     $ESCAPE
6236  027702  005737  001410                  TST     LPFLG
6237  027706  001402                          BEQ     70$
6238  027710  000177  151174                  JMP     @$LPERR         ;SW 9 WAS SET.
6239  027714  000177  151166          70$:    JMP     @$LPADR         ;SW 14 OR 8 WAS SET
6240
6241
6242
6243  027720                          10$:
6244  027720  005237  001410                  INC     LPFLG
6245  027724  032777  001000  151206          BIT     #SW9,@SWR       ;LOOP ON ERROR?
6246  027732  001312                          BNE     6$              ;YES, RECONDITION DRIVE
6247  027734  000137  027230                  JMP     2$              ;RETURN TO MAINLINE
6248
6249  027740                          12$:
6250  027740  005237  001410                  INC     LPFLG
6251  027744  032777  001000  151166          BIT     #SW9,@SWR       ;LOOP ON ERROR?
6252  027752  001302                          BNE     6$              ;YES, RECONDITION DRIVE
6253  027754  000137  027552                  JMP     4$              ;RETURN TO MAINLINE
6254
6255                                  ;;*****************************************************************
6256                                  ;*TEST 33       READ & SAVE BAD SECTOR INFO & TYPE PACK SERIAL #
6257                                  ;*
6258                                  ;*      THIS TEST VERIFIES THAT CYL 410, TRACK 2 CAN BE READ.
6259                                  ;*      THIS AREA CONTAINS BAD SECTOR INFO WHICH IS WRITTEN BY THE
6260                                  ;*      FACTORY DURING MANF.  ALL BAD SECTOR INFO (BSE) WILL BE STORED
6261                                  ;*      AT THIS TIME TO MASK FUTURE READ HEADER OR DATA ERROR PRINTOUTS.
6262                                  ;*
6263                                  ;*      SECTORS 0,2,4,6,8 CONTAIN IDENTICAL INFO FOR 22 SECTOR HARDWARE DETECTED FOR BAD
6264                                  ;*      SECTORS 10,12,14,16,18,20 CONTAIN IDENTICAL INFO FOR 22 SECTOR SOFTWARE DETECTED
6265                                  ;*
6266                                  ;*      IF BSE INFO CANNOT BE READ, OR IF AFTER READING THE BSE INFO
6267                                  ;*      IT IS DETERMINED THAT AN ALIGNMENT CARTRIDGE IS USED,
6268                                  ;*      A MSG WILL BE TYPED INDICATING THAT ALL
6269                                  ;*      FUTURE FORMAT AND READ-WRITE TESTS WILL BE BYPASSED.
6270                                  ;*      THIS IS DONE SO AS NOT TO DESTROY BSE INFO OR AN ALIGNMENT PACK BY WRITING
6271                                  ;*
6272                                  ;*      THE PACK SERIAL # IS TYPED IN OCTAL & FOR THE FIRST PASS ONLY.
6273                                  ;*
6274                                  ;*       THIS IS THE FIRST TEST WHERE THE READ DATA CMD IS PERFORMED
6275                                  ;*
6276                                  ;*****************************************************************
6277  027760  000004                  TST33:  SCOPE
6278  027762  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
6279  027770  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
```

```
6280
6281  027774  004737  046106                  JSR     PC,SUBCLR
6282  030000  104024                          ERROR   24                  ;CERR AFTER SCLR
6283  030002  005037  003374                  CLR     TEMP2               ;SECTOR CTR
6284  030006  005037  003376                  CLR     TEMP3               ;0=22 SECTOR HARDWARE DETECTED TABLE
6285                                                                      ;1=22 SECTOR SOFTWARE DETECTED TABLE
6286                                                                      ;2=DONE
6287  030012  012737  002304  003400          MOV     #BSE22H,TEMP4       ;STORE 22 SECTOR HARDWARE BSE INFO
6288  030020  013765  003400  000004          MOV     TEMP4,RKBA(R5)
6289  030026  012737  001000  003402          MOV     #100C,TEMP5         ;TRACK 2, SECTOR 0
6290  030034  013765  003402  000006          MOV     TEMP5,RKDA(R5)
6291
6292  030042  012765  000632  000020  1$:     MOV     #410.,RKDC(R5)      ;CYL 410
6293  030050  012765  177400  000002          MOV     #-256.,RKWC(R5)     ;LOAD WORD CT
6294  030056  012765  000021  000000          MOV     #RDDATA,RKCS1(R5)   ;READ DATA CMD
6295  030064  013737  001426  003372          MOV     TS0000,TEMP1        ;SETUP TIMEOUT
6296  030072  004737  044176                  JSR     PC,FRDY             ;FIND RDY
6297  030076  104226                          ERROR   226                 ;NO RDY AFTER READ DATA CMD
6298  030100  004737  045534                  JSR     PC,GSTAT            ;GET FRESH STATUS
6299  030104  032737  100000  003334          BIT     #CERR,HCS1
6300  030112  001470                          BEQ     8$
6301  030114  104227                          ERROR   227                 ;CERR AFTER READ DATA CMD
6302
6303  030116  012737  010340  003424          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
6304  030124  005037  003426                  CLR     E.B0                ;EXPECTED MSG B0
6305  030130  012737  001720  003430          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
6306  030136  012737  000001  003432          MOV     #1,E.B1             ;MSG ID FOR EXPECTED MSG B1
6307  030144  005037  003434                  CLR     E.A2                ;EXPECTED MSG A2
6308  030150  012737  000002  003436          MOV     #2,E.B2             ;MSG ID FOR EXPECTED MSG B2
6309  030156  012737  000003  003442          MOV     #3,E.B3             ;MSG ID FOR EXPECTED MSG B3
6310
6311  030164  004737  044720                  JSR     PC,CHKMSG           ;CHECK MSGS A0,B0,A1,B1
6312  030170  000000                          .WORD   0!0!0               ;& MSGS SPECIFIED HERE
6313  030172  104051                          ERROR   51                  ;MSG A0 ERROR AFTER READ DATA CMD
6314  030174  104052                          ERROR   52                  ;MSG B0 ERROR
6315  030176  104112                          ERROR   112                 ;MSG A1 ERROR
6316  030200  104113                          ERROR   113                 ;MSG B1 ERROR
6317
6318  030202  004737  046106                  JSR     PC,SUBCLR
6319  030206  104024                          ERROR   24                  ;CERR AFTER SUBCLR
6320
6321  030210  005237  003374                  INC     TEMP2
6322  030214  023727  003374  000005          CMP     TEMP2,#5            ;READ ALL 5 SECTORS?
6323  030222  001007                          BNE     5$
6324  030224  005737  003376                  TST     TEMP3
6325  030230  001002                          BNE     2$
6326  030232  104233                          ERROR   233                 ;CANT READ SECTORS 0,2,4,6,8
6327  030234  000414                          BR      3$
6328  030236  104230                  2$:     ERROR   230                 ;CANT READ SECTORS 10,12,14,16,18,20
6329  030240  000412                          BR      3$
6330
6331  030242  013765  003400  000004  5$:     MOV     TEMP4,RKBA(R5)      ;RESTORE TABLE ADDR
6332  030250  062737  000002  003402          ADD     #2,TEMP5            ;SETUP TO READ 2 SECTORS FROM LAST
6333  030256  013765  003402  000006          MOV     TEMP5,RKDA(R5)
6334  030264  000666                          BR      1$
6335
```

```
 6336  030266  005237  001456          3$:     INC     BSERR           ;SET BSE FLAG
 6337  030272  000454                          BR      TST34           ;;GO TO NEXT TEST
 6338
 6339  030274  005737  002312          8$:     TST     BSE22H+6        ;TEST CARTRIDGE TYPE
 6340  030300  001404                          BEQ     9$              ;BRANCH IF DATA CARTRIDGE
 6341  030302  104235                          ERROR   235             ;ALIGNMENT CARTRIDGE USED
 6342  030304  005237  001456                  INC     BSERR           ;SET BSE ERROR FLAG
 6343  030310  000426                          BR      10$
 6344
 6345  030312  005237  003376          9$:     INC     TEMP3
 6346  030316  023727  003376  000001          CMP     TEMP3,#1
 6347  030324  001020                          BNE     10$
 6348  030326  005037  003374                  CLR     TEMP2
 6349  030332  012737  054752  003400          MOV     #BSE22S,TEMP4   ;STORE 22 SECTOR SOFTWARE BSE ADDR
 6350  030340  013765  003400  000004          MOV     TEMP4,RKBA(R5)
 6351  030346  012737  001012  003402          MOV     #1012,TEMP5     ;TRACK 2, SECTOR 12
 6352  030354  013765  003402  000006          MOV     TEMP5,RKDA(R5)
 6353  030362  000137  030042                  JMP     1$              ;REPEAT
 6354
 6355  030366  005737  001216          10$:    TST     $PASS
 6356  030372  001014                          BNE     TST34           ;;GO TO NEXT TST IF NOT 1'ST PASS
 6357  030374  104401  056571                  TYPE    ,MSG17          ;CART SERIAL #
 6358  030400  012746  002304                  MOV     #BSE22H,-(SP)
 6359  030404  004737  054156                  JSR     PC,$DB2O        ;CONVERT DBL BINARY WORD TO OCTAL
 6360  030410  004737  054526                  JSR     PC,$SUPRS       ;TYPE SERIAL #
 6361  030414  104401  001205                  TYPE    ,$CRLF
 6362  030420  104401  001205                  TYPE    ,$CRLF
 6363
 6364                                  ;;*****************************************************************
 6365                                  ;*TEST 34       DETECT INNER LIMIT
 6366                                  ;*
 6367                                  ;*      THIS TEST VERIFIES THAT THE LAST CYL IN THE ABOVE
 6368                                  ;*      TEST WAS 410 BY DETECTING INNER LIMIT AS THE ADJACENT CYL.
 6369                                  ;*      IF THIS TEST FAILS, IT INDICATES THAT HEADS WERE NOT ON CYL 410
 6370                                  ;*      & THAT BSE INFO IS NOT VALID.  THE FORMAT PACK TEST
 6371                                  ;*      & ALL READ-WRITE TESTS ARE BYPASSED
 6372                                  ;*      TO AVOID DESTROYING BSE INFO OR AN ALIGNMENT CARTRIDGE
 6373                                  ;*      SINCE THERE IS A SEEKING OR LIMIT DETECTION PROBLEM.
 6374                                  ;*
 6375                                  ;;*****************************************************************
 6376  030424  000004          TST34:  SCOPE
 6377  030426  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
 6378  030434  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
 6379
 6380  030440  004737  046106                  JSR     PC,SUBCLR       ;SUBSYS CLEAR & GET STATUS
 6381  030444  104024                          ERROR   24              ;CERR AFTER SCLR
 6382
 6383  030446  005037  001410                  CLR     LPFLG
 6384  030452  005237  001462                  INC     BYPCERR         ;BYPASS CHECKING FOR ANY CERR IN GSTAT1
 6385  030456  005237  003316                  INC     UNLD            ;USED FOR VALID HALT
 6386
 6387  030462  012765  000020  000026          MOV     #PAT,RKMR1(R5)  ;PARITY & WORD 0
 6388  030470  012765  000631  000020          MOV     #409.,RKDC(R5)  ;CYL 409.
 6389  030476  012765  000017  000000          MOV     #SEEK,RKCS1(R5) ;SEEK CMD
 6390  030504  013737  001414  003372          MOV     T10,TEMP1
 6391  030512  004737  044176                  JSR     PC,FRDY         ;FIND RDY
```

```
6392  030516  104122                          ERROR   122             ;NO RDY FROM SEEK WITH BAD PARITY
6393  030520  004737  044460                  JSR     PC,TSTATN       ;TEST FOR ATTN
6394  030524  104125                          ERROR   125             ;NO ATTN FROM SEEK WITH BAD PARITY
6395  030526  012737  050340  003424          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED A0
6396  030534  012737  001200  003426          MOV     #<D.FLT!D.PAR>,E.B0
6397  030542  012737  001720  003430          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D:SSP>,E.A1
6398  030550  012737  000001  003432          MOV     #1,E.B1
6399
6400  030556  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
6401  030562  000000                          .WORD   0!0!0           ;& MSGS SPECIFIED HERE
6402  030564  104110                          ERROR   110             ;MSG A0 ERROR AFTER SEEK WITH BAD PARITY
6403  030566  104111                          ERROR   111             ;MSG B0 ERROR
6404  030570  104146                          ERROR   146             ;MSG A1 ERROR
6405  030572  104147                          ERROR   147             ;MSG B1 ERROR
6406
6407  030574  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
6408  030602  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
6409  030610  012765  000005  000000          MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
6410  030616  013737  001414  003372          MOV     T10,TEMP1
6411  030624  004737  044176                  JSR     PC,FRDY         ;FIND RDY
6412  030630  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
6413  030632  004737  044460                  JSR     PC,TSTATN       ;TEST FOR ATTN
6414  030636  000401                          BR      64$
6415  030640  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
6416  030642                          64$:
6417
6418  030642  012737  010340  003424          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
6419  030650  005037  003426                  CLR     E.B0            ;EXPECTED MSG B0
6420  030654  012737  001720  003430          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
6421  030662  012737  000001  003432          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
6422  030670  005037  003434                  CLR     E.A2            ;EXPECTED MSG A2
6423  030674  012737  000002  003436          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
6424  030702  012737  000003  003442          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
6425
6426  030710  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
6427  030714  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
6428  030716  104273                          ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
6429  030720  104265                          ERROR   265             ;MSG B0 ERROR
6430  030722  104274                          ERROR   274             ;MSG A1 ERROR
6431  030724  104266                          ERROR   266             ;MSG B1 ERROR
6432
6433
6434
6435  030726  012765  000632  000020          MOV     #410.,RKDC(R5)  ;CYL 410.
6436  030734  012765  000017  000000          MOV     #SEEK,RKCS1(R5) ;SEEK TO CYL 410.
6437  030742  013737  001414  003372          MOV     T10,TEMP1
6438  030750  004737  044176                  JSR     PC,FRDY         ;FIND RDY
6439  030754  104131                          ERROR   131             ;NO RDY AFTER SEEK CMD
6440  030756  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
6441  030764  004737  045534                  JSR     PC,GSTAT
6442  030770  004737  046742                  JSR     PC,FLIM         ;FIND LIMIT DETECT
6443  030774  104160                          ERROR   160             ;LIMIT DETECT NOT FOUND BEFORE TIMEOUT
6444
6445
6446  030776  032737  040000  003362          BIT     #D.UNLD,HMR2
6447  031004  001003                          BNE     1$
```

```
  6448  031006  104305                          ERROR   305             ;DRIVE NOT UNLOADING AFTER LIMIT DETECT
  6449  031010  000137  031646                  JMP     30$             ;BYPASS REST OF TEST
  6450
  6451
  6452
  6453
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  6460
  6461
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  6463
  6464
  6465
  6466
  6467  031014  012737  031562  001176  1$:     MOV     #20$,$ESCAPE    ;MUST ESCAPE TO CYCLE UP DRIVE & TEST SWP
  6468  031022  012737  070140  003424          MOV     #<D.DSC!D.PIP!D.SPIN!D.VV!D.DRA>,E.A0   ;EXPECTED A0
  6469  031030  012737  002200  003426          MOV     #<D.SKI!D.FLT>,E.B0
  6470  031036  012737  045720  003430          MOV     #<D.UNLD!D.REV!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
  6471  031044  012737  030001  003432          MOV     #<D.LIMD!D.NMOV!1>,E.B1
  6472
  6473  031052  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
  6474  031056  000000                          .WORD   0!0!0           ;& MSGS SPECIFIED HERE
  6475  031060  104161                          ERROR   161             ;MSG A0 ERROR AFTER INNER LIMIT DETECT
  6476  031062  104162                          ERROR   162             ;MSG B0 ERROR
  6477  031064  104163                          ERROR   163             ;MSG A1 ERROR
  6478  031066  104164                          ERROR   164             ;MSG B1 ERROR
  6479
  6480  031070  004737  044460                  JSR     PC,TSTATN
  6481  031074  104165                          ERROR   165             ;NO ATTN AFTER INNER LIMIT DETECT
  6482  031076  005037  001462                  CLR     BYPCERR         ;ALLOW CHECKING CERR IN GSTAT1
  6483
  6484  031102  004737  046106                  JSR     PC,SUBCLR       ;SUBSYS CLR
  6485  031106  104024                          ERROR   24              ;CERR AFTER SCLR
  6486  031110  013737  001414  003374          MOV     T10,TEMP2       ;SET UP TIMEOUT
  6487  031116  004737  047020                  JSR     PC,FHDHM        ;FIND HEAD HOME
  6488  031122  104166                          ERROR   166             ;HEAD HOME NOT FOUND BEFORE TIMEOUT
  6489  031124  004737  047074                  JSR     PC,FLOAD        ;FIND LOAD HEADS
  6490  031130  104167                          ERROR   167             ;LOAD HEADS NOT FOUND BEFORE TIMEOUT
  6491  031132  013737  001414  003374          MOV     T10,TEMP2       ;SETUP TIMEOUT
  6492  031140  004737  044512                  JSR     PC,FATT1        ;FIND ATTN
  6493  031144  104067                          ERROR   67              ;ATTN NOT FOUND BEFORE TIMEOUT
  6494  031146  005037  001176          2$:     CLR     $ESCAPE
  6495
  6496  031152  012737  050340  003424          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
  6497  031160  005037  003426                  CLR     E.B0            ;EXPECTED MSG B0
  6498  031164  012737  001720  003430          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
  6499  031172  012737  000001  003432          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
  6500  031200  005037  003434                  CLR     E.A2            ;EXPECTED MSG A2
  6501  031204  012737  000002  003436          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
  6502  031212  012737  000003  003442          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
  6503
```

```
6504  031220  004737  044720          JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
6505  031224  000003                  .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
6506  031226  104063                  ERROR   63              ;MSG A0 ERROR AT END OF HEAD LOADING
6507  031230  104064                  ERROR   64              ;MSG B0 ERROR
6508  031232  104065                  ERROR   65              ;MSG A1 ERROR
6509  031234  104066                  ERROR   66              ;MSG B1 ERROR
6510
6511  031236  005737  001362          TST     CYLDIF          ;SEE IF MSG A2=0
6512  031242  001401                  BEQ     65$             ;BR IF YES
6513  031244  104175                  ERROR   175             ;MSG A2 NOT CLEARED AT END OF HEAD LOADING
6514  031246  005737  001364  65$:    TST     CYLADD          ;SEE IF MSG B2=0
6515  031252  001401                  BEQ     66$             ;BR IF YES
6516  031254  104176                  ERROR   176             ;MSG B2 NOT CLEARED AT END OF HEAD LOADING
6517  031256                  66$:
6518
6519  031256  012765  100000  000000  MOV     #CCLR,RKCS1(R5)
6520  031264  013765  001222  000010  MOV     $UNIT,RKCS2(R5) ;DRIVE#
6521  031272  012765  000005  000000  MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
6522  031300  013737  001414  003372  MOV     T10,TEMP1
6523  031306  004737  044176          JSR     PC,FRDY         ;FIND RDY
6524  031312  104151                  ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
6525  031314  004737  044460          JSR     PC,TSTATN       ;TEST FOR ATTN
6526  031320  000401                  BR      67$
6527  031322  104154                  ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
6528  031324                  67$:
6529
6530  031324  012737  010340  003424  MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
6531  031332  005037  003426          CLR     E.B0            ;EXPECTED MSG B0
6532  031336  012737  001720  003430  MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
6533  031344  012737  000001  003432  MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
6534  031352  005037  003434          CLR     E.A2            ;EXPECTED MSG A2
6535  031356  012737  000002  003436  MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
6536  031364  012737  000003  003442  MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
6537
6538  031372  004737  044720          JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
6539  031376  000003                  .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
6540  031400  104273                  ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
6541  031402  104265                  ERROR   265             ;MSG B0 ERROR
6542  031404  104274                  ERROR   274             ;MSG A1 ERROR
6543  031406  104266                  ERROR   266             ;MSG B1 ERROR
6544
6545  031410  005037  003316          CLR     UNLD            ;USED FOR VALID HALT
6546  031414  004737  050036          JSR     PC,SWTST        ;SEE IF SW 14 OR 8 IS SET
6547  031420  000512                  BR      TST35           ;;GO TO NEXT TEST
6548                                                          ;RETURN HERE IF SW 14 IS SET OR
6549                                                          ;SW 8 WITH SWR <7:0> APPLY
6550
6551
6552  031422                  10$:
6553
6554  031422  004737  046106          JSR     PC,SUBCLR
6555  031426  104024                  ERROR   24              ;CERR AFTER SCRL
6556
6557  031430  013765  001352  000020  68$:    MOV     TOCYL,RKDC(R5)  ;CYL#
6558
6559  031436  012765  000017  000000          MOV     #SEEK,RKCS1(R5) ;SEEK CMD TO RECONDITION DRIVE.
```

```
6560  031444  013737  001414  003372          MOV     T10,TEMP1       ;SETUP TIMEOUT
6561  031452  004737  044176                  JSR     PC,FRDY         ;FIND RDY
6562  031456  104131                          ERROR   131             ;NO RDY AFTER SEEK CMD.
6563
6564  031460  013737  001424  003372          MOV     T5000,TEMP1
6565  031466  004737  044606                  JSR     PC,FATT2        ;FIND ATTN
6566  031472  104132                          ERROR   132             ;NO ATTN AFTER SEEK CMD
6567  031474  032737  100000  003334          BIT     #CERR,HCS1
6568  031502  001401                          BEQ     70$
6569  031504  104210                          ERROR   210             ;CERR AFTER SEEK CMD.
6570
6571  031506  004737  046106          70$:    JSR     PC,SUBCLR
6572  031512  104024                          ERROR   24              ;CERR AFTER SCLR
6573
6574  031514  023727  001352  000632          CMP     TOCYL,#410.     ;ALL CYL DONE?
6575  031522  001403                          BEQ     69$             ;BR IF YES
6576  031524  005237  001352                  INC     TOCYL           ;ELSE DO ANOTHER
6577  031530  000737                          BR      68$
6578
6579  031532  004737  046106          69$:    JSR     PC,SUBCLR
6580  031536  104024                          ERROR   24              ;CERR AFTER SCLR
6581
6582  031540  005037  001176                  CLR     $ESCAPE
6583  031544  005737  001410                  TST     LPFLG
6584  031550  001402                          BEQ     71$
6585  031552  000177  147332                  JMP     @$LPERR         ;SW 9 WAS SET.
6586  031556  000177  147324          71$:    JMP     @$LPADR         ;SW 14 OR 8 WAS SET
6587
6588  031562                          20$:
6589
6590  031562  004737  046105                  JSR     PC,SUBCLR
6591  031566  104024                          ERROR   24              ;CERR AFTER SCLR
6592
6593  031570  012765  000011  000000          MOV     #SRTSPL,RKCS1(R5)       ;START SPINDLE CMD
6594  031576  013737  001414  003372          MOV     T10,TEMP1       ;SET TIMEOUT
6595  031604  004737  044176                  JSR     PC,FRDY         ;FIND RDY
6596  031610  104121                          ERROR   121             ;RDY NOT FOUND AFTER ST SPIN CMD.
6597
6598  031612  013737  001416  003374          MOV     T100,TEMP2      ;SETUP  TIMEOUT
6599  031620  004737  044512                  JSR     PC,FATT1        ;FIND ATTN
6600  031624  104067                          ERROR   67              ;NO ATTN AFTER ST SPIN CMD.
6601  031626  005237  001410                  INC     LPFLG
6602  031632  032777  001000  147300          BIT     #SW9,@SWR       ;LOOP ON ERROR?
6603  031640  001270                          BNE     10$             ;YES, RECONDITION DRIVE
6604  031642  000137  031146                  JMP     2$              ;RETURN TO MAINLINE
6605  031646                          30$:
6606
6607  031646                          FORM:
6608                                  ;;*****************************************************************
6609                                  ;*TEST 35       FORMAT PACK
6610                                  ;*
6611                                  ;*      THIS TEST FORMATS THE ENTIRE PACK IN 22 SECTOR FORMAT BY
6612                                  ;*      DOING 1 CYL INCREMENTAL SEEKS
6613                                  ;*      FROM 0 TO 410 WITH WRITE HEADER CMDS (ALL TRACKS).
6614                                  ;*      HEADERS WILL BE READ IN THE NEXT TEST
6615                                  ;*
```

```
                                ;;*****************************************************************
                        T35:    SCOPE
031646  000004
031650  012737  000001  001174        MOV     #1,$TIMES       ;;DO 1 ITERATION

031656  012706  001100              MOV     #STACK,SP       ;RESTORE STK PTR
031662  005737  001342              TST     MODTST          ;SEE IF MODULE TESTING
031666  001402                      BEQ     22$             ;BR IF NO
031670  104401  056672              TYPE    .MSG20          ;RUNNING MODIFIED VERSION OF TEST

031674  005737  001460      22$:    TST     LIMERROR                ;CHECK IF FOUND LIMIT DETECT ERROR
031700  001403                      BEQ     1$
031702  104170                      ERROR   170             ;FORMAT TEST BYPASSED, LIMIT DETECT ERROR
031704  000137  033750              JMP     13$
031710  005737  001456      1$:     TST     BSERR           ;CHECK IF FOUND BSE INFO OK
031714  001403                      BEQ     2$
031716  104177                      ERROR   177             ;FORMAT TEST BYPASSED-BSE ERROR
031720  000137  033750              JMP     13$

031724  004737  046106      2$:     JSR     PC,SUBCLR
031730  104024                      ERROR   24              ;CERR AFTER SCLR

031732  104401  056407              TYPE    .MSG12          ;FORMATTING PACK, PLEASE WAIT

031736  005037  001352              CLR     TOCYL

031742  013737  001352  001366      MOV     TOCYL,CALADD    ;SETUP
031750  012737  000000  001430      MOV     #0,HEAD         ;TO FILL
031756  012737  000000  001436      MOV     #0,FORMAT       ;HEADER
031764  004737  047142              JSR     PC,FHDTAB       ;TABLE

031770  012765  001470  000004  9$: MOV     #HDTAB,RKBA(R5) ;THIS SECTION
031776  012765  177676  000002      MOV     #-66.,RKWC(R5)  ;OF CODE
032004  000337  001430              SWAB    HEAD            ;IS TO RESTORE STANDARD FORMAT
032010  013765  001430  000006      MOV     HEAD,RKDA(R5)   ;TO CYL 0
032016  000337  001430              SWAB    HEAD            ;HEAD 0,1 & 2

032022  012765  000027  000000      MOV     #<WRHEAD>,RKCS1(R5)     ;WRITE HEADER CMD
032030  013737  001426  003372      MOV     T50000,TEMP1    ;SETUP TIMEOUT
032036  004737  044176              JSR     PC,FRDY         ;FIND RDY
032042  104200                      ERROR   200             ;NO RDY AFTER WRITE HEADER CMD
032044  004737  045534              JSR     PC,GSTAT        ;GET FRESH STATUS
032050  032737  100000  003334      BIT     #CERR,HCS1
032056  001405                      BEQ     64$
032060  104201                      ERROR   201             ;CERR AFTER WRITE HEADER CMD
032062  104401  056606              TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
032066  000137  043470              JMP     $EOP            ;ABORT DRIVE
032072                          64$:

032072  005237  001430              INC     HEAD
032076  023727  001430  000003      CMP     HEAD,#3
032104  001403                      BEQ     11$             ;BR IF ALL HEADS DONE

032106  004737  047142              JSR     PC,FHDTAB
032112  000726                      BR      9$
```

```
 6672
 6673  032114  012737  000001  001366  11$:    MOV     #1,CALADD       ;SETUP
 6674  032122  005037  001430              CLR     HEAD            ;FOR
 6675  032126  005037  001436              CLR     FORMAT          ;FHDTAB ROUTINE
 6676
 6677  032132  012737  000001  001360      MOV     #1,CALDIF       ;SETUP
 6678  032140  005037  001350              CLR     FRCYL           ;FOR
 6679  032144  012737  000001  001352      MOV     #1,TOCYL        ;ERROR REPORT
 6680                                                              ;START FORMATTING CYL 1 TO 410 HERE
 6681
 6682
 6683  032152                          3$:
 6684  032152  104415                      SCOPI
 6685  032154  012706  001100              MOV     #STACK,SP       ;RESTORE STK PTR
 6686
 6687  032160  004737  046106              JSR     PC,SUBCLR
 6688  032164  104024                      ERROR   24              ;CERR AFTER SCLR
 6689
 6690  032166  005737  001342              TST     MODTST          ;SEE IF MODULE TESTING
 6691  032172  001404                      BEQ     18$             ;BR IF NO
 6692  032174  012737  033710  001176      MOV     #16$,$ESCAPE
 6693  032202  000403                      BR      19$
 6694  032204  012737  033410  001176  18$:MOV     #10$,$ESCAPE
 6695  032212  013765  001366  000020  19$:MOV     CALADD,RKDC(R5) ;CYL #
 6696  032220  000337  001430              SWAB    HEAD
 6697  032224  013765  001430  000006      MOV     HEAD,RKDA(R5)   ;HEAD #
 6698  032232  000337  001430              SWAB    HEAD
 6699
 6700  032236  012765  000017  000000      MOV     #SEEK,RKCS1(R5) ;SEEK CMD
 6701  032244  013737  001414  003372      MOV     T10,TEMP1       ;SETUP  TIMEOUT
 6702  032252  004737  044176              JSR     PC,FRDY         ;FIND RDY
 6703  032256  104131                      ERROR   131             ;NO RDY AFTER SEEK CMD
 6704  032260  012737  030140  003424      MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
 6705  032266  005037  003426              CLR     E.B0
 6706  032272  012737  003720  003430      MOV     #<D.FWD!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
 6707  032300  012737  000001  003432      MOV     #1,E.B1
 6708
 6709  032306  004737  044720              JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
 6710  032312  000003                      .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
 6711  032314  104203                      ERROR   203             ;MSG A0 ERROR DURING SEEK CMD
 6712  032316  104204                      ERROR   204             ;MSG B0 ERROR
 6713  032320  104205                      ERROR   205             ;MSG A1 ERROR
 6714  032322  104206                      ERROR   206             ;MSG B1 ERROR
 6715
 6716  032324  023727  001362  000001      CMP     CYLDIF,#1
 6717  032332  001401                      BEQ     4$
 6718  032334  104212                      ERROR   212             ;CYL DIFF INCORRECT DURING SEEK
 6719
 6720  032336  005737  001342          4$: TST     MODTST          ;SEE IF MODULE TESTING
 6721  032342  001404                      BEQ     20$             ;BR IF NO
 6722  032344  012737  033730  001176      MOV     #17$,$ESCAPE
 6723  032352  000403                      BR      21$
 6724
 6725  032354  012737  033430  001176  20$:MOV     #12$,$ESCAPE
 6726  032362  012737  004704  003372  21$:MOV     #2500.,TEMP1    ;SETUP TIMEOUT
 6727
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```
                                        JSR     PC,FATT2        ;FIND ATTN
                                        ERROR   132             ;NO ATTN AFTER SEEK CMD
                                        BIT     #CERR,HCS1
                                        BEQ     65$
                                        ERROR   210             ;CERR AFTER SEEK CMD
                                65$:

                                        MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
                                        CLR     E.B0            ;EXPECTED MSG B0
                                        MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
                                        MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
                                        CLR     E.A2            ;EXPECTED MSG A2
                                        MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
                                        MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3

                                        JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
                                        .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
                                        ERROR   133             ;MSG A0 ERROR AFTER SEEK CMD
                                        ERROR   134             ;MSG B0 ERROR
                                        ERROR   135             ;MSG A1 ERROR
                                        ERROR   136             ;MSG B1 ERROR
                                        TST     CYLDIF
                                        BEQ     66$
                                        ERROR   137             ;CYL DIFF NOT CLEARED AFTER SEEK CMD

                                66$:

                                        MOV     #CCLR,RKCS1(R5)
                                        MOV     $UNIT,RKCS2(R5) ;DRIVE#
                                        MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
                                        MOV     T10,TEMP1
                                        JSR     PC,FRDY         ;FIND RDY
                                        ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
                                        JSR     PC,TSTATN       ;TEST FOR ATTN
                                        BR      67$
                                        ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
                                67$:

                                        MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
                                        CLR     E.B0            ;EXPECTED MSG B0
                                        MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
                                        MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
                                        CLR     E.A2            ;EXPECTED MSG A2
                                        MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
                                        MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3

                                        JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
                                        .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
                                        ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
                                        ERROR   265             ;MSG B0 ERROR
                                        ERROR   274             ;MSG A1 ERROR
                                        ERROR   266             ;MSG B1 ERROR

                                        CMP     CYLADD,CALADD
                                        BEQ     5$
                                        ERROR   232             ;CYL ADDR IN RKMR2 NOT=RKDC
```

```
032650                          5$:
032650                                  SCOPI
032650  104415
032652  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR

032656  004737  046106                  JSR     PC,SUBCLR
032662  104024                          ERROR   24              ;CERR AFTER SCLR

032664  005037  001176                  CLR     $ESCAPE
032670  004737  047142                  JSR     PC,FHDTAB       ;FILL HEADER TABLE
032674  000337  001430                  SWAB    HEAD
032700  013765  001430  000006          MOV     HEAD,RKDA(R5)   ;SET TRACK #
032706  000337  001430                  SWAB    HEAD
032712  012765  001470  000004          MOV     #HDTAB,RKBA(R5) ;HEADER WORD TABLE
032720  012765  177676  000002          MOV     #-66.,RKWC(R5)  ;WORD CT
032726  013765  001366  000020          MOV     CALADD,RKDC(R5) ;CYL #

032734  012765  000027  000000          MOV     #<WRHEAD),RKCS1(R5)     ;WRITE HEADER CMD
032742  013737  001426  003372          MOV     T50000,TEMP1    ;SETUP TIMEOUT
032750  004737  044176                  JSR     PC,FRDY         ;FIND RDY
032754  104200                          ERROR   200             ;NO RDY AFTER WRITE HEADER CMD
032756  004737  045534                  JSR     PC,GSTAT        ;GET FRESH STATUS
032762  032737  100000  003334          BIT     #CERR,HCS1
032770  001405                          BEQ     68$
032772  104201                          ERROR   201             ;CERR AFTER WRITE HEADER CMD
032774  104401  056606                  TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
033000  000137  043470                  JMP     $EOP            ;ABORT DRIVE
033004                          68$:

033004  012737  010340  003424          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
033012  005037  003426                  CLR     E.B0            ;EXPECTED MSG B0
033016  012737  001720  003430          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
033024  012737  000001  003432          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
033032  005037  003434                  CLR     E.A2            ;EXPECTED MSG A2
033036  012737  000002  003436          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
033044  012737  000003  003442          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3

033052  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
033056  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
033060  104277                          ERROR   277             ;MSG A0 ERROR AFTER WRITE HEADER CMD
033062  104267                          ERROR   267             ;MSG B0 ERROR
033064  104300                          ERROR   300             ;MSG A1 ERROR
033066  104270                          ERROR   270             ;MSG B1 ERROR

033070  005737  001342                  TST     MODTST          ;SEE IF MODULE TESTING
033074  001402                          BEQ     23$             ;BR IF NO
033076  000137  033450                  JMP     14$             ;ELSE RESTORE HEADERS ONLY

033102  005237  001430          23$:    INC     HEAD
033106  023727  001430  000002          CMP     HEAD,#2
033114  001006                          BNE     6$
033116  023727  001366  000632          CMP     CALADD,#410.    ;HEAD 2, SEE IF CYL 410
033124  001002                          BNE     6$              ;DO NOT WRITE ON CYL 410 HEAD 2
033126  000137  033360                  JMP     7$
```

```
 6840
 6841  033132  023727  001430  000003  65$:    CMP     HEAD,#3          ;ALL HEADS DONE?
 6842  033140  001243                          BNE     5$               ;BR IF NO
 6843  033142  005037  001430                  CLR     HEAD             ;ALL HEADS ON CYL DONE
 6844  033146  005237  001366                  INC     CALADD           ;GO TO NEXT CYL
 6845  033152  005237  001350                  INC     FRCYL            ;FOR ERROR REPORT
 6846  033156  005237  001352                  INC     TOCYL            ;FOR ERROR REPORT
 6847  033162  005737  003322                  TST     HPEND            ;SEE IF HALT PENDING
 6848  033166  001002                          BNE     24$              ;BR IF YES
 6849  033170  000137  032152                  JMP     3$               ;ELSE KEEP FORMATTING
 6850
 6851  033174  005037  003322          24$:    CLR     HPEND            ;CLEAR FOR FUTURE FORMATTING
 6852  033200  005037  003320                  CLR     BADHDR           ;HEADERS NOW OK
 6853  033204  000137  050106                  JMP     STOP             ;GO & HALT THE CPU
 6854
 6855  033210  005037  001366          8$:     CLR     CALADD
 6856  033214  005037  001350                  CLR     FRCYL
 6857
 6858  033220  004737  046106                  JSR     PC,SUBCLR
 6859  033224  104024                          ERROR   24               ;CERR AFTER SCRL
 6860
 6861  033226  013765  001352  000020  69$:    MOV     TOCYL,RKDC(R5)   ;CYL#
 6862
 6863  033234  012765  000017  000000          MOV     #SEEK,RKCS1(R5)  ;SEEK CMD TO RECONDITION DRIVE.
 6864  033242  013737  001414  003372          MOV     TIO,TEMP1        ;SETUP TIMEOUT
 6865  033250  004737  044176                  JSR     PC,FRDY          ;FIND RDY
 6866  033254  104131                          ERROR   131              ;NO RDY AFTER SEEK CMD.
 6867
 6868  033256  013737  001424  003372          MOV     T5000,TEMP1
 6869  033264  004737  044606                  JSR     PC,FATT2         ;FIND ATTN
 6870  033270  104132                          ERROR   132              ;NO ATTN AFTER SEEK CMD
 6871  033272  032737  100000  003334          BIT     #CERR,HCS1
 6872  033300  001401                          BEQ     71$
 6873  033302  104210                          ERROR   210              ;CERR AFTER SEEK CMD.
 6874
 6875  033304  004737  046106          71$:    JSR     PC,SUBCLR
 6876  033310  104024                          ERROR   24               ;CERR AFTER SCLR
 6877
 6878  033312  023727  001352  000000          CMP     TOCYL,#0         ;ALL CYL DONE?
 6879  033320  001403                          BEQ     70$              ;BR IF YES
 6880  033322  005337  001352                  DEC     TOCYL            ;ELSE DO ANOTHER
 6881  033326  000737                          BR      69$
 6882
 6883  033330  004737  046106          70$:    JSR     PC,SUBCLR
 6884  033334  104024                          ERROR   24               ;CERR AFTER SCLR
 6885
 6886  033336  005037  001176                  CLR     $ESCAPE
 6887  033342  005737  001410                  TST     LPFLG
 6888  033346  001402                          BEQ     72$
 6889  033350  000177  145534                  JMP     @$LPERR          ;SW 9 WAS SET.
 6890  033354  000177  145526          72$:    JMP     @$LPADR          ;SW 14 OR 8 WAS SET
 6891
 6892
 6893  033360                          7$:
 6894  033360  004737  050036                  JSR     PC,SWTST         ;SEE IF SW 14 OR 8 IS SET
 6895  033364  000571                          BR      TST36            ;;GO TO NEXT TEST
```

```
                                                        ;RETURN HERE IF SW 14 IS SET OR
                                                        ;SW 8 WITH SWR <7:0> APPLY
033366  005037  001176                CLR     $ESCAPE
033372  005737  001410                TST     LPFLG
033376  001402                        BEQ     73$
033400  000177  145504                JMP     @$LPERR         ;SW 9 WAS SET.
033404  000177  145476        73$:    JMP     @$LPADR         ;SW 14 OR 8 WAS SET

033410                        10$:
033410  005237  001410                INC     LPFLG
033414  032777  001000  145516        BIT     #SW9,@SWR       ;LOOP ON ERROR?
033422  001272                        BNE     8$              ;YES, RECONDITION DRIVE
033424  000137  032336                JMP     4$              ;RETURN TO MAINLINE

033430                        12$:
033430  005237  001410                INC     LPFLG
033434  032777  001000  145476        BIT     #SW9,@SWR       ;LOOP ON ERROR?
033442  001262                        BNE     8$              ;YES, RECONDITION DRIVE
033444  000137  032650                JMP     5$              ;RETURN TO MAINLINE


033450  005237  001430        14$:    INC     HEAD
033454  023727  001430  000003        CMP     HEAD,#3         ;SEE IF ALL HEADS DONE
033462  001402                        BEQ     15$             ;BR IF YES TO GO BACK TO CYL 0
033464  000137  032650                JMP     5$              ;ELSE REPEAT FOR NEXT HEAD

033470  005065  000006        15$:    CLR     RKDA(R5)        ;SEEK TO CYL 0 & READ HEADERS
033474  005037  001352                CLR     TOCYL           ;TO RECONDITION DRIVE

033500  012765  000017  000000        MOV     #SEEK,RKCS1(R5) ;SEEK CMD TO RECONDITION DRIVE.
033506  013737  001414  003372        MOV     T10,TEMP1       ;SETUP TIMEOUT
033514  004737  044176                JSR     PC,FRDY         ;FIND RDY
033520  104131                        ERROR   131             ;NO RDY AFTER SEEK CMD.

033522  013737  001424  003372        MOV     T5000,TEMP1
033530  004737  044636                JSR     PC,FATT2        ;FIND ATTN
033534  104132                        ERROR   132             ;NO ATTN AFTER SEEK CMD
033536  032737  100000  003334        BIT     #CERR,HCS1
033544  001401                        BEQ     74$
033546  104210                        ERROR   210             ;CERR AFTER SEEK CMD.

033550  004737  046106        74$:    JSR     PC,SUBCLR
033554  104024                        ERROR   24              ;CERR AFTER SCLR


033556  012700  001674                MOV     #RHTAB,R0
033562  012765  000025  000000        MOV     #<RDHEAD>,RKCS1(R5)     ;READ HEADER CMD
033570  013737  001426  003372        MOV     T5000,TEMP1     ;SETUP TIMEOUT
033576  004737  044176                JSR     PC,FRDY         ;FIND RDY
033602  104171                        ERROR   171             ;NO RDY AFTER READ HEADER CMD
033604  032737  100000  003334        BIT     #CERR,HCS1
033612  001405                        BEQ     76$
033614  104174                        ERROR   174             ;CERR AFTER READ HEADER CMD
033616  104401  056606                TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
033622  000137  043470                JMP     $EOP            ;ABORT DRIVE
```

```
6952
6953  033626  016520  000024          76$:    MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
6954  033632  016520  000024                  MOV     RKDB(R5),(R0)+  ;2'ND WORD
6955  033636  016520  000024                  MOV     RKDB(R5),(R0)+  ;3'RD WORD
6956
6957
6958  033642  032765  100000  000010          BIT     #DLT,RKCS2(R5)
6959  033650  001407                          BEQ     77$
6960  033652  004737  045534                  JSR     PC,GSTAT
6961  033656  104173                          ERROR   173             ;DLT AFTER READ HEADER CMD
6962  033660  104401  056606                  TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
6963  033664  000137  043470                  JMP     $EOP            ;ABORT DRIVE
6964  033670                          77$:
6965
6966  033670  023737  001674  001352          CMP     RHTAB,TOCYL     ;CHECK WORD 0 (CYL#) ONLY
6967  033676  001401                          BEQ     75$             ;BR IF SAME
6968  033700  104310                          ERROR   310             ;READ CYL WORD HEADER ERROR
6969  033702                          75$:
6970
6971  033702  004737  050036                  JSR     PC,SWTST        ;SEE IF SW 14 OR 8 IS SET
6972  033706  000420                          BR      TST36           ;;GO TO NEXT TEST
6973                                                                  ;RETURN HERE IF SW 14 IS SET OR
6974                                                                  ;SW 8 WITH SWR <7:0> APPLY
6975  033710                          16$:
6976  033710  005237  001410                  INC     LPFLG
6977  033714  032777  001000  145216          BIT     #SW9,@SWR       ;LOOP ON ERROR?
6978  033722  001262                          BNE     15$             ;YES, RECONDITION DRIVE
6979  033724  000137  032336                  JMP     4$              ;RETURN TO MAINLINE
6980  033730                          17$:
6981  033730  005237  001410                  INC     LPFLG
6982  033734  032777  001000  145176          BIT     #SW9,@SWR       ;LOOP ON ERROR?
6983  033742  001252                          BNE     15$             ;YES, RECONDITION DRIVE
6984  033744  000137  032650                  JMP     5$              ;RETURN TO MAINLINE
6985
6986
6987  033750                          13$:
6988
6989
6990
6991                                          ;;*****************************************************************
6992                                          ;*TEST 36       DECREMENT FROM CYL 410 TO 0 & READ HEADERS
6993                                          ;*
6994                                          ;*      THIS TEST VERIFIES MOTION IN THE NEGATIVE DIRECTION BY
6995                                          ;*      SINGLE CYL INCREMENTAL SEEKS.
6996                                          ;*
6997                                          ;;*****************************************************************
6998  033750  000004                  TST36:  SCOPE
6999  033752  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
7000  033760  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
7001
7002  033764  104401  057121                  TYPE    ,MSG22          ;FORMATTING FINISHED
7003  033770  005737  001342                  TST     MODTST          ;SEE IF MODULE TESTING
7004  033774  001404                          BEQ     5$              ;BR IF NO
7005  033776  104401  057041                  TYPE    ,MSG21          ;BYP TESTS 36,40,41
7006  034002  000137  035044                  JMP     13$
7007  034006  012737  000632  001350  5$:     MOV     #410.,FRCYL     ;FROM CYL
```

```
 7008  034014  012737  000631  001352          MOV     #409.,TOCYL     ;TO CYL
 7009
 7010  034022                          1$:
 7011  034022  104415                          SCOP1
 7012  034024  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
 7013
 7014  034030  004737  046106                  JSR     PC,SUBCLR
 7015  034034  104024                          ERROR   24              ;CERR AFTER SCLR
 7016
 7017  034036  012737  035004  001176          MOV     #10$,$ESCAPE
 7018  034044  013765  001352  000020          MOV     TOCYL,RKDC(R5)  ;CYL #
 7019
 7020  034052  012765  000017  000000          MOV     #SEEK,RKCS1(R5) ;SEEK CMD
 7021  034060  013737  001414  003372          MOV     T10,TEMP1       ;SETUP  TIMEOUT
 7022  034066  004737  044176                  JSR     PC,FRDY         ;FIND RDY
 7023  034072  104131                          ERROR   131             ;NO RDY AFTER SEEK CMD
 7024  034074  012737  030140  003424          MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
 7025  034102  005037  003426                  CLR     E.B0
 7026  034106  012737  005720  003430          MOV     #<D.REV!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
 7027  034114  012737  000001  003432          MOV     #1,E.B1
 7028
 7029  034122  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
 7030  034126  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
 7031  034130  104203                          ERROR   203             ;MSG A0 ERROR DURING SEEK CMD
 7032  034132  104204                          ERROR   204             ;MSG B0 ERROR
 7033  034134  104205                          ERROR   205             ;MSG A1 ERROR
 7034  034136  104206                          ERROR   206             ;MSG B1 ERROR
 7035
 7036  034140  023727  001362  000001          CMP     CYLDIF,#1
 7037  034146  001401                          BEQ     2$
 7038  034150  104212                          ERROR   212             ;CYL DIFF INCORRECT DURING SEEK
 7039
 7040  034152  012737  035024  001176  2$:     MOV     #12$,$ESCAPE
 7041  034160  012737  004704  003372          MOV     #2500.,TEMP1    ;SETUP TIMEOUT
 7042
 7043  034166  004737  044606                  JSR     PC,FATT2        ;FIND ATTN
 7044  034172  104132                          ERROR   132             ;NO ATTN AFTER SEEK CMD
 7045  034174  032737  100000  003334          BIT     #CERR,HCS1
 7046  034202  001401                          BEQ     64$
 7047  034204  104210                          ERROR   210             ;CERR AFTER SEEK CMD
 7048  034206                          64$:
 7049
 7050  034206  012737  050340  003424          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
 7051  034214  005037  003426                  CLR     E.B0            ;EXPECTED MSG B0
 7052  034220  012737  001720  003430          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
 7053  034226  012737  000001  003432          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
 7054  034234  005037  003434                  CLR     E.A2            ;EXPECTED MSG A2
 7055  034240  012737  000002  003436          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
 7056  034246  012737  000003  003442          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
 7057
 7058  034254  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
 7059  034260  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
 7060  034262  104133                          ERROR   133             ;MSG A0 ERROR AFTER SEEK CMD
 7061  034264  104134                          ERROR   134             ;MSG B0 ERROR
 7062  034266  104135                          ERROR   135             ;MSG A1 ERROR
 7063  034270  104136                          ERROR   136             ;MSG B1 ERROR
```

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7064  034272  005737  001362          TST     CYLDIF
7065  034276  001401                  BEQ     65$
7066  034300  104137                  ERROR   137             ;CYL DIFF NOT CLEARED AFTER SEEK CMD
7067
7068  034302                        65$:
7069
7070  034302  012765  100000  000000  MOV     #CCLR,RKCS1(R5)
7071  034310  013765  001222  000010  MOV     $UNIT,RKCS2(R5) ;DRIVE#
7072  034316  012765  000005  000000  MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
7073  034324  013737  001414  003372  MOV     T10,TEMP1
7074  034332  004737  044176          JSR     PC,FRDY         ;FIND RDY
7075  034336  104151                  ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
7076  034340  004737  044460          JSR     PC,TSTATN       ;TEST FOR ATTN
7077  034344  000401                  BR      66$
7078  034346  104154                  ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
7079  034350                        66$:
7080
7081  034350  012737  010340  003424  MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
7082  034356  005037  003426          CLR     E.B0            ;EXPECTED MSG B0
7083  034362  012737  001720  003430  MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
7084  034370  012737  000001  003432  MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
7085  034376  005037  003434          CLR     E.A2            ;EXPECTED MSG A2
7086  034402  012737  000002  003436  MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
7087  034410  012737  000003  003442  MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
7088
7089  034416  004737  044720          JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
7090  034422  000003                  .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
7091  034424  104273                  ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
7092  034426  104265                  ERROR   265             ;MSG B0 ERROR
7093  034430  104274                  ERROR   274             ;MSG A1 ERROR
7094  034432  104266                  ERROR   266             ;MSG B1 ERROR
7095
7096  034434  023737  001364  001352  CMP     CYLADD,TOCYL
7097  034442  001401                  BEQ     3$
7098  034444  104207                  ERROR   207             ;CYL ADDR IN RKMR3 NOT = RKDC
7099
7100  034446                        3$:
7101  034446  104415                  SCOP1
7102  034450  012706  001100          MOV     #STACK,SP       ;RESTORE STK PTR
7103
7104  034454  004737  046106          JSR     PC,SUBCLR
7105  034460  104024                  ERROR   24              ;CERR AFTER SCLR
7106
7107  034462  005037  001176          CLR     $ESCAPE
7108
7109  034466  013765  001352  000020  MOV     TOCYL,RKDC(R5)  ;CYL #
7110
7111
7112  034474  012700  001674          MOV     #RHTAB,R0
7113  034500  012765  000025  000000  MOV     #<RDHEAD>,RKCS1(R5)     ;READ HEADER CMD
7114  034506  013737  001426  003372  MOV     T50000,TEMP1    ;SETUP  TIMEOUT
7115  034514  004737  044176          JSR     PC,FRDY         ;FIND RDY
7116  034520  104171                  ERROR   171             ;NO RDY AFTER READ HEADER CMD
7117  034522  032737  100000  003334  BIT     #CERR,HCS1
7118  034530  001405                  BEQ     68$
7119  034532  104174                  ERROR   174             ;CERR AFTER READ HEADER CMD
```

```
 7120  034534  104401  056606                 TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
 7121  034540  000137  043470                 JMP     $EOP            ;ABORT DRIVE
 7122
 7123  034544  016520  000024          68$:   MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
 7124  034550  016520  000024                 MOV     RKDB(R5),(R0)+  ;2'ND WORD
 7125  034554  016520  000024                 MOV     RKDB(R5),(R0)+  ;3'RD WORD
 7126
 7127
 7128  034560  032765  100000  000010         BIT     #DLT,RKCS2(R5)
 7129  034566  001407                         BEQ     69$
 7130  034570  004737  045534                 JSR     PC,GSTAT
 7131  034574  104173                         ERROR   173             ;DLT AFTER READ HEADER CMD
 7132  034576  104401  056606                 TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
 7133  034602  000137  043470                 JMP     $EOP            ;ABORT DRIVE
 7134  034606                          69$:
 7135
 7136  034606  023737  001674  001352         CMP     RHTAB,TOCYL     ;CHECK WORD 0 (CYL#) ONLY
 7137  034614  001401                         BEQ     67$             ;BR IF SAME
 7138  034616  104310                         ERROR   310             ;READ CYL WORD HEADER ERROR
 7139  034620                          67$:
 7140
 7141  034620  005337  001350                 DEC     FRCYL
 7142  034624  001404                         BEQ     4$
 7143  034626  005337  001352                 DEC     TOCYL
 7144  034632  000137  034022                 JMP     1$
 7145
 7146  034636                          4$:
 7147  034636  004737  050036                 JSR     PC,SWTST        ;SEE IF SW 14 OR 8 IS SET
 7148  034642  000500                         BR      TST37           ;GO TO NEXT TEST
 7149                                                                 ;RETURN HERE IF SW 14 IS SET OR
 7150                                                                 ;SW 8 WITH SWR <7:0> APPLY
 7151
 7152
 7153  034644                          5$:
 7154
 7155  034644  004737  046106                 JSR     PC,SUBCLR
 7156  034650  104024                         ERROR   24              ;CERR AFTER SCRL
 7157
 7158  034652  013765  001352  000020  70$:   MOV     TOCYL,RKDC(R5)  ;CYL#
 7159
 7160  034660  012765  000017  000000         MOV     #SEEK,RKCS1(R5) ;SEEK CMD TO RECONDITION DRIVE.
 7161  034666  013737  001414  003372         MOV     T10,TEMP1       ;SETUP TIMEOUT
 7162  034674  004737  044176                 JSR     PC,FRDY         ;FIND RDY
 7163  034700  104131                         ERROR   131             ;NO RDY AFTER SEEK CMD.
 7164
 7165  034702  013737  001424  003372         MOV     T5000,TEMP1
 7166  034710  004737  044606                 JSR     PC,FATT2        ;FIND ATTN
 7167  034714  104132                         ERROR   132             ;NO ATTN AFTER SEEK CMD
 7168  034716  032737  100000  003334         BIT     #CERR,HCS1
 7169  034724  001401                         BEQ     72$
 7170  034726  104210                         ERROR   210             ;CERR AFTER SEEK CMD.
 7171
 7172  034730  004737  046106          72$:   JSR     PC,SUBCLR
 7173  034734  104024                         ERROR   24              ;CERR AFTER SCLR
 7174
 7175  034736  023727  001352  000632         CMP     TOCYL,#410.     ;ALL CYL DONE?
```

```
 7176  034744  001403                        BEQ     71$             ;BR IF YES
 7177  034746  005237  001352                INC     TOCYL           ;ELSE DO ANOTHER
 7178  034752  000737                        BR      70$
 7179
 7180  034754  004737  046106        71$:    JSR     PC,SUBCLR
 7181  034760  104024                        ERROR   24              ;CERR AFTER SCLR
 7182
 7183  034762  005037  001176                CLR     $ESCAPE
 7184  034766  005737  001410                TST     LPFLG
 7185  034772  001402                        BEQ     73$
 7186  034774  000177  144110                JMP     @$LPERR         ;SW 9 WAS SET.
 7187  035000  000177  144102        73$:    JMP     @$LPADR         ;SW 14 OR 8 WAS SET
 7188
 7189
 7190
 7191  035004                        10$:
 7192  035004  005237  001410                INC     LPFLG
 7193  035010  032777  001000  144122        BIT     #SW9,@SWR       ;LOOP ON ERROR?
 7194  035016  001312                        BNE     6$              ;YES, RECONDITION DRIVE
 7195  035020  000137  034152                JMP     2$              ;RETURN TO MAINLINE
 7196
 7197  035024                        12$:
 7198  035024  005237  001410                INC     LPFLG
 7199  035030  032777  001000  144102        BIT     #SW9,@SWR       ;LOOP ON ERROR?
 7200  035036  001302                        BNE     6$              ;YES, RECONDITION DRIVE
 7201  035040  000137  034446                JMP     3$              ;RETURN TO MAINLINE
 7202
 7203  035044                        13$:
 7204
 7205
 7206                                  ;;*****************************************************************
 7207                                  ;*TEST 37       SEEK FROM CYL 0 TO ALL MAJOR CYLS & READ HEADERS
 7208                                  ;*
 7209                                  ;*      THIS TEST SEEKS FROM CYL 0 TO ALL THE MAJOR CYLS & READS HEADERS.
 7210                                  ;*      IT THEN SEEKS CYL 0 & READS HEADERS.
 7211                                  ;*
 7212                                  ;*      MAJOR CYLS ARE: 1  (DECIMAL)  =  1 (OCTAL)
 7213                                  ;*                      2                2
 7214                                  ;*                      4                4
 7215                                  ;*                      8                10
 7216                                  ;*                      16               20
 7217                                  ;*                      32               40
 7218                                  ;*                      64               100
 7219                                  ;*                      128              200
 7220                                  ;*                      256              400
 7221                                  ;*
 7222                                  ;;*****************************************************************
 7223  035044  000004                TST37:  SCOPE
 7224  035046  012737  000001  001174        MOV     #1,$TIMES       ;;DO 1 ITERATION
 7225  035054  012706  001100                MOV     #STACK,SP       ;RESTORE STK PTR
 7226
 7227  035060  012737  000000  001350        MOV     #0,FRCYL        ;SETUP FROM CYL
 7228  035066  012737  000001  001352        MOV     #1,TOCYL        ;SETUP TO CYL
 7229
 7230  035074                        1$:
 7231  035074  104415                        SCOP1
```

```
7232  035076  012706  001100                MOV     #STACK,SP       ;RESTORE STK PTR
7233
7234  035102  004737  046106                JSR     PC,SUBCLR
7235  035106  104024                        ERROR   24              ;CERR AFTER SCLR
7236
7237  035110  012737  036670  001176        MOV     #10$,$ESCAPE
7238  035116  013737  001350  003376        MOV     FRCYL,TEMP3     ;SETUP
7239  035124  013737  001352  003400        MOV     TOCYL,TEMP4     ;CYL DIFF
7240  035132  163737  003376  003400        SUB     TEMP3,TEMP4     ;FOR
7241  035140  013737  003400  001360        MOV     TEMP4,CALDIF    ;ERROR PRINTOUT
7242
7243  035146  013765  001352  000020        MOV     TOCYL,RKDC(R5)  ;GO TO CYL #
7244
7245  035154  012765  000017  000000        MOV     #SEEK,RKCS1(R5) ;SEEK CMD
7246  035162  013737  001414  003372        MOV     T10,TEMP1       ;SETUP  TIMEOUT
7247  035170  004737  044176                JSR     PC,FRDY         ;FIND RDY
7248  035174  104131                        ERROR   131             ;NO RDY AFTER SEEK CMD
7249  035176  012737  030140  003424        MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
7250  035204  005037  003426                CLR     E.B0
7251  035210  012737  003720  003430        MOV     #<D.FWD!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
7252  035216  012737  000001  003432        MOV     #1,E.B1
7253
7254  035224  004737  044720                JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
7255  035230  000003                        .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
7256  035232  104203                        ERROR   203             ;MSG A0 ERROR DURING SEEK CMD
7257  035234  104204                        ERROR   204             ;MSG B0 ERROR
7258  035236  104205                        ERROR   205             ;MSG A1 ERROR
7259  035240  104206                        ERROR   206             ;MSG B1 ERROR
7260
7261  035242  012737  036710  001176  2$:   MOV     #12$,$ESCAPE
7262  035250  013737  001424  003372        MOV     T5000,TEMP1     ;SETUP  TIMEOUT
7263
7264  035256  004737  044606                JSR     PC,FATT2        ;FIND ATTN
7265  035262  104132                        ERROR   132             ;NO ATTN AFTER SEEK CMD
7266  035264  032737  100000  003334        BIT     #CERR,HCS1
7267  035272  001401                        BEQ     64$
7268  035274  104210                        ERROR   210             ;CERR AFTER SEEK CMD
7269  035276                        64$:
7270
7271  035276  012737  050340  003424        MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
7272  035304  005037  003426                CLR     E.B0            ;EXPECTED MSG B0
7273  035310  012737  001720  003430        MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
7274  035316  012737  000001  003432        MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
7275  035324  005037  003434                CLR     E.A2            ;EXPECTED MSG A2
7276  035330  012737  000002  003436        MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
7277  035336  012737  000003  003442        MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
7278
7279  035344  004737  044720                JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
7280  035350  000003                        .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
7281  035352  104133                        ERROR   133             ;MSG A0 ERROR AFTER SEEK CMD
7282  035354  104134                        ERROR   134             ;MSG B0 ERROR
7283  035356  104135                        ERROR   135             ;MSG A1 ERROR
7284  035360  104136                        ERROR   136             ;MSG B1 ERROR
7285  035362  005737  001362                TST     CYLDIF
7286  035366  001401                        BEQ     65$
7287  035370  104137                        ERROR   137             ;CYL DIFF NOT CLEARED AFTER SEEK CMD
```

```
7288
7289  035372                                  65$:
7290
7291  035372  012765  100000  000000            MOV     #CCLR,RKCS1(R5)
7292  035400  013765  001222  000010            MOV     $UNIT,RKCS2(R5) ;DRIVE#
7293  035406  012765  000005  000000            MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
7294  035414  013737  001414  003372            MOV     T10,TEMP1
7295  035422  004737  044176                    JSR     PC,FRDY         ;FIND RDY
7296  035426  104151                            ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
7297  035430  004737  044460                    JSR     PC,TSTATN       ;TEST FOR ATTN
7298  035434  000401                            BR      66$
7299  035436  104154                            ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
7300  035440                                  66$:
7301
7302  035440  012737  010340  003424            MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
7303  035446  005037  003426                    CLR     E.B0            ;EXPECTED MSG B0
7304  035452  012737  001720  003430            MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
7305  035460  012737  000001  003432            MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
7306  035466  005037  003434                    CLR     E.A2            ;EXPECTED MSG A2
7307  035472  012737  000002  003436            MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
7308  035500  012737  000003  003442            MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
7309
7310  035506  004737  044720                    JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
7311  035512  000003                            .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
7312  035514  104273                            ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
7313  035516  104265                            ERROR   265             ;MSG B0 ERROR
7314  035520  104274                            ERROR   274             ;MSG A1 ERROR
7315  035522  104266                            ERROR   266             ;MSG B1 ERROR
7316
7317  035524  023737  001364  001352            CMP     CYLADD,TOCYL
7318  035532  001401                            BEQ     3$
7319  035534  104207                            ERROR   207             ;CYL ADDR IN RKMR3 NOT=RKDC
7320
7321  035536                                  3$:
7322  035536  104415                            SCOP1
7323  035540  012706  001100                    MOV     #STACK,SP       ;RESTORE STK PTR
7324
7325  035544  004737  046106                    JSR     PC,SUBCLR
7326  035550  104024                            ERROR   24              ;CERR AFTER SCLR
7327
7328  035552  005037  001176                    CLR     $ESCAPE
7329  035556  013765  001352  000020            MOV     TOCYL,RKDC(R5)  ;CYL #
7330
7331
7332  035564  012700  001674                    MOV     #RHTAB,R0
7333  035570  012765  000025  000000            MOV     #<RDHEAD>,RKCS1(R5)     ;READ HEADER CMD
7334  035576  013737  001426  003372            MOV     T50000,TEMP1    ;SETUP  TIMEOUT
7335  035604  004737  044176                    JSR     PC,FRDY         ;FIND RDY
7336  035610  104171                            ERROR   171             ;NO RDY AFTER READ HEADER CMD
7337  035612  032737  100000  003334            BIT     #CERR,HCS1
7338  035620  001405                            BEQ     68$
7339  035622  104174                            ERROR   174             ;CERR AFTER READ HEADER CMD
7340  035624  104401  056606                    TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
7341  035630  000137  043470                    JMP     $EOP            ;ABORT DRIVE
7342
7343  035634  016520  000024          68$:      MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
```

```
 7344  035640  016520  000024              MOV     RKDB(R5),(R0)+  ;2'ND WORD
 7345  035644  016520  000024              MOV     RKDB(R5),(R0)+  ;3'RD WORD
 7346
 7347
 7348  035650  032765  100000  000010      BIT     #DLT,RKCS2(R5)
 7349  035656  001407                      BEQ     69$
 7350  035660  004737  045534              JSR     PC,GSTAT
 7351  035664  104173                      ERROR   173             ;DLT AFTER READ HEADER CMD
 7352  035666  104401  056606              TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
 7353  035672  000137  043470              JMP     $EOP            ;ABORT DRIVE
 7354  035676                          69$:
 7355
 7356  035676  023737  001674  001352      CMP     RHTAB,TOCYL     ;CHECK WORD 0 (CYL#) ONLY
 7357  035704  001401                      BEQ     67$             ;BR IF SAME
 7358  035706  104310                      ERROR   310             ;READ CYL WORD HEADER ERROR
 7359  035710                          67$:
 7360
 7361
 7362  035710  104415                      SCOP1
 7363  035712  012706  001100              MOV     #STACK,SP       ;RESTORE STK PTR
 7364
 7365  035716  004737  046106              JSR     PC,SUBCLR
 7366  035722  104024                      ERROR   24              ;CERR AFTER SCLR
 7367
 7368  035724  012737  036730  001176      MOV     #14$,$ESCAPE
 7369  035732  013765  001350  000020      MOV     FRCYL,RKDC(R5)  ;RETURN TO CYL #
 7370  035740  013737  001350  001354      MOV     FRCYL,CCYL      ;CURRENT CYL FOR TRJERROR ROUTINE
 7371
 7372  035746  012765  000017  000000      MOV     #SEEK,RKCS1(R5) ;SEEK CMD
 7373  035754  013737  001414  003372      MOV     T10,TEMP1       ;SETUP  TIMEOUT
 7374  035762  004737  044176              JSR     PC,FRDY         ;FIND RDY
 7375  035766  104131                      ERROR   131             ;NO RDY AFTER SEEK CMD
 7376  035770  012737  030140  003424      MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
 7377  035776  005037  003426              CLR     E.B0
 7378  036002  012737  005720  003430      MOV     #<D.REV!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
 7379  036010  012737  000001  003432      MOV     #1,E.B1
 7380
 7381  036016  004737  044720              JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
 7382  036022  000003                      .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
 7383  036024  104203                      ERROR   203             ;MSG A0 ERROR DURING SEEK CMD
 7384  036026  104204                      ERROR   204             ;MSG B0 ERROR
 7385  036030  104205                      ERROR   205             ;MSG A1 ERROR
 7386  036032  104206                      ERROR   206             ;MSG B1 ERROR
 7387
 7388
 7389  036034  012737  036750  001176  4$: MOV     #16$,$ESCAPE
 7390  036042  013737  001424  003372      MOV     T5000,TEMP1     ;SETUP  TIMEOUT
 7391
 7392  036050  004737  044606              JSR     PC,FATT2        ;FIND ATTN
 7393  036054  104132                      ERROR   132             ;NO ATTN    R SEEK CMD
 7394  036056  032737  100000  003334      BIT     #CERR,HCS1
 7395  036064  001401                      BEQ     70$
 7396  036066  104210                      ERROR   210             ;CERR AFTER SEEK CMD
 7397  036070                          70$:
 7398
 7399  036070  012737  050340  003424      MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
```

```
7400  036076  005037  003426                CLR     E.B0            ;EXPECTED MSG B0
7401  036102  012737  001720  003430        MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
7402  036110  012737  000001  003432        MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
7403  036116  005037  003434                CLR     E.A2            ;EXPECTED MSG A2
7404  036122  012737  000002  003436        MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
7405  036130  012737  000003  003442        MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
7406
7407  036136  004737  044720                JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
7408  036142  000003                        .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
7409  036144  104133                        ERROR   133             ;MSG A0 ERROR AFTER SEEK CMD
7410  036146  104134                        ERROR   134             ;MSG B0 ERROR
7411  036150  104135                        ERROR   135             ;MSG A1 ERROR
7412  036152  104136                        ERROR   136             ;MSG B1 ERROR
7413  036154  005737  001362                TST     CYLDIF
7414  036160  001401                        BEQ     71$
7415  036162  104137                        ERROR   137             ;CYL DIFF NOT CLEARED AFTER SEEK CMD
7416
7417  036164                        71$:
7418
7419  036164  012765  100000  000000        MOV     #CCLR,RKCS1(R5)
7420  036172  013765  001222  000010        MOV     $UNIT,RKCS2(R5) ;DRIVE#
7421  036200  012765  000005  000000        MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
7422  036206  013737  001414  003372        MOV     T10,TEMP1
7423  036214  004737  044176                JSR     PC,FRDY         ;FIND RDY
7424  036220  104151                        ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
7425  036222  004737  044460                JSR     PC,TSTATN       ;TEST FOR ATTN
7426  036226  000401                        BR      72$
7427  036230  104154                        ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
7428  036232                        72$:
7429
7430  036232  012737  010340  003424        MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
7431  036240  005037  003426                CLR     E.B0            ;EXPECTED MSG B0
7432  036244  012737  001720  003430        MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
7433  036252  012737  000001  003432        MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
7434  036260  005037  003434                CLR     E.A2            ;EXPECTED MSG A2
7435  036264  012737  000002  003436        MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
7436  036272  012737  000003  003442        MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
7437
7438  036300  004737  044720                JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
7439  036304  000003                        .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
7440  036306  104273                        ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
7441  036310  104265                        ERROR   265             ;MSG B0 ERROR
7442  036312  104274                        ERROR   274             ;MSG A1 ERROR
7443  036314  104266                        ERROR   266             ;MSG B1 ERROR
7444
7445  036316  023737  001364  001350        CMP     CYLADD,FRCYL
7446  036324  001401                        BEQ     5$
7447  036326  104243                        ERROR   243             ;CYL ADDR IN RKMR3 NOT=RKDC
7448
7449  036330                        5$:
7450  036330  104415                        SCOP1
7451  036332  012706  001100                MOV     #STACK,SP       ;RESTORE STK PTR
7452
7453  036336  004737  046106                JSR     PC,SUBCLR
7454  036342  104024                        ERROR   24              ;CERR AFTER SCLP
7455
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 7456  036344  005037  001176                  CLR     $ESCAPE
 7457  036350  013765  001350  000020          MOV     FRCYL,RKDC(R5)  ;CYL #
 7458
 7459
 7460  036356  012700  001674                  MOV     #RHTAB,R0
 7461  036362  012765  000025  000000          MOV     #<RDHEAD>,RKCS1(R5)     ;READ HEADER CMD
 7462  036370  013737  001426  003372          MOV     T50000,TEMP1    ;SETUP  TIMEOUT
 7463  036376  004737  044176                  JSR     PC,FRDY         ;FIND RDY
 7464  036402  104171                          ERROR   171             ;NO RDY AFTER READ HEADER CMD
 7465  036404  032737  100000  003334          BIT     #CERR,HCS1
 7466  036412  001405                          BEQ     74$
 7467  036414  104174                          ERROR   174             ;CERR AFTER READ HEADER CMD
 7468  036416  104401  056606                  TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
 7469  036422  000137  043470                  JMP     $EOP            ;ABORT DRIVE
 7470
 7471  036426  016520  000024          74$:    MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
 7472  036432  016520  000024                  MOV     RKDB(R5),(R0)+  ;2'ND WORD
 7473  036436  016520  000024                  MOV     RKDB(R5),(R0)+  ;3'RD WORD
 7474
 7475
 7476  036442  032765  100000  000010          BIT     #DLT,RKCS2(R5)
 7477  036450  001407                          BEQ     75$
 7478  036452  004737  045534                  JSR     PC,GSTAT
 7479  036456  104173                          ERROR   173             ;DLT AFTER READ HEADER CMD
 7480  036460  104401  056606                  TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
 7481  036464  000137  043470                  JMP     $EOP            ;ABORT DRIVE
 7482  036470                          75$:
 7483
 7484  036470  023737  001674  001350          CMP     RHTAB,FRCYL     ;CHECK WORD 0 (CYL#) ONLY
 7485  036476  001401                          BEQ     73$             ;BR IF SAME
 7486  036500  104311                          ERROR   311             ;READ CYL WORD HEADER ERROR
 7487  036502                          73$:
 7488
 7489
 7490  036502  023727  001352  000400          CMP     TOCYL,#400      ;ALL CYL DONE?
 7491  036510  001404                          BEQ     6$              ;BR IF YES
 7492  036512  006337  001352                  ASL     TOCYL           ;ELSE DO ANOTHER
 7493  036516  000137  035074                  JMP     1$
 7494  036522                          6$:
 7495  036522  004737  050036                  JSR     PC,SWTST        ;SEE IF SW 14 OR 8 IS SET
 7496  036526  000520                          BR      TST40           ;;GO TO NEXT TEST
 7497                                          ;RETURN HERE IF SW 14 IS SET OR
 7498                                          ;SW 8 WITH SWR (7:0) APPLY
 7499  036530                          8$:
 7500
 7501  036530  004737  046106                  JSR     PC,SUBCLR
 7502  036534  104024                          ERROR   24              ;CERR AFTER SCRL
 7503
 7504  036536  013765  001352  000020  76$:    MOV     TOCYL,RKDC(R5)  ;CYL#
 7505
 7506  036544  012765  000017  000000          MOV     #SEEK,RKCS1(R5) ;SEEK CMD TO RECONDITION DRIVE.
 7507  036552  013737  001414  003372          MOV     T10,TEMP1       ;SETUP TIMEOUT
 7508  036560  004737  044176                  JSR     PC,FRDY         ;FIND RDY
 7509  036564  104131                          ERROR   131             ;NO RDY AFTER SEEK CMD.
 7510
 7511  036566  013737  001424  003372          MOV     T5000,TEMP1
```

```
7512  036574  004737  044606          JSR     PC,FATT2        ;FIND ATTN
7513  036600  104132                  ERROR   132             ;NO ATTN AFTER SEEK CMD
7514  036602  032737  100000  003334  BIT     #CERR,HCS1
7515  036610  001401                  BEQ     78$
7516  036612  104210                  ERROR   210             ;CERR AFTER SEEK CMD.
7517
7518  036614  004737  046106  78$:    JSR     PC,SUBCLR
7519  036620  104024                  ERROR   24              ;CERR AFTER SCLR
7520
7521  036622  023727  001352  000000  CMP     TOCYL,#0        ;ALL CYL DONE?
7522  036630  001403                  BEQ     77$             ;BR IF YES
7523  036632  005337  001352          DEC     TOCYL           ;ELSE DO ANOTHER
7524  036636  000737                  BR      76$
7525
7526  036640  004737  046106  77$:    JSR     PC,SUBCLR
7527  036644  104024                  ERROR   24              ;CERR AFTER SCLR
7528
7529  036646  005037  001176          CLR     $ESCAPE
7530  036652  005737  001410          TST     LPFLG
7531  036656  001402                  BEQ     79$
7532  036660  000177  142224          JMP     @$LPERR         ;SW 9 WAS SET.
7533  036664  000177  142216  79$:    JMP     @$LPADR         ;SW 14 OR 8 WAS SET
7534
7535  036670          10$:
7536  036670  005237  001410          INC     LPFLG
7537  036674  032777  001000  142236  BIT     #SW9,@SWR       ;LOOP ON ERROR?
7538  036702  001312                  BNE     8$              ;YES, RECONDITION DRIVE
7539  036704  000137  035242          JMP     2$              ;RETURN TO MAINLINE
7540  036710          12$:
7541  036710  005237  001410          INC     LPFLG
7542  036714  032777  001000  142216  BIT     #SW9,@SWR       ;LOOP ON ERROR?
7543  036722  001302                  BNE     8$              ;YES, RECONDITION DRIVE
7544  036724  000137  035536          JMP     3$              ;RETURN TO MAINLINE
7545  036730          14$:
7546  036730  005237  001410          INC     LPFLG
7547  036734  032777  001000  142176  BIT     #SW9,@SWR       ;LOOP ON ERROR?
7548  036742  001272                  BNE     8$              ;YES, RECONDITION DRIVE
7549  036744  000137  036034          JMP     4$              ;RETURN TO MAINLINE
7550  036750          16$:
7551  036750  005237  001410          INC     LPFLG
7552  036754  032777  001000  142156  BIT     #SW9,@SWR       ;LOOP ON ERROR?
7553  036762  001262                  BNE     8$              ;YES, RECONDITION DRIVE
7554  036764  000137  036330          JMP     5$              ;RETURN TO MAINLINE
7555
7556
7557
7558                                  ;;*****************************************************************
7559                                  ;*TEST 40        SEEK TO ALL CYLS FROM 0 & READ HEADERS
7560                                  ;;*****************************************************************
7561  036770  000004          TST40:  SCOPE
7562  036772  012737  000001  001174  MOV     #1,$TIMES       ;;DO 1 ITERATION
7563  037000  012706  001100          MOV     #STACK,SP       ;RESTORE STK PTR
7564
7565  037004  005737  001342          TST     MODTST          ;SEE IF MODULE TESTING
7566  037010  001402                  BEQ     DOSEEK          ;BR IF NO
7567  037012  000137  042744          JMP     CYLINV          ;ELSE BYPASS TESTS 40 & 41
```

```
007568  037016                                  DOSEEK:
007569
007570  037016  012737  000000  001350          MOV     #0,FRCYL        ;SETUP FROM CYL
007571  037024  012737  000001  001352          MOV     #1,TOCYL        ;SETUP TO CYL
007572
007573  037032                                  1$:
007574  037032  104415                          SCOPI
007575  037034  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
007576
007577  037040  004737  046106                  JSR     PC,SUBCLR
007578  037044  104024                          ERROR   24              ;CERR AFTER SCLR
007579
007580  037046  012737  040626  001176          MOV     #10$,$ESCAPE
007581  037054  013737  001350  003376          MOV     FRCYL,TEMP3     ;SETUP
007582  037062  013737  001352  003400          MOV     TOCYL,TEMP4     ;CYL DIFF
007583  037070  163737  003376  003400          SUB     TEMP3,TEMP4     ;FOR
007584  037076  013737  003400  001360          MOV     TEMP4,CALDIF    ;ERROR PRINTOUT
007585
007586  037104  013765  001352  000020          MOV     TOCYL,RKDC(R5)  ;GO TO CYL #
007587
007588  037112  012765  000017  000000          MOV     #SEEK,RKCS1(R5) ;SEEK CMD
007589  037120  013737  001414  003372          MOV     T10,TEMP1       ;SETUP  TIMEOUT
007590  037126  004737  044176                  JSR     PC,FRDY         ;FIND RDY
007591  037132  104131                          ERROR   131             ;NO RDY AFTER SEEK CMD
007592  037134  012737  030140  003424          MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
007593  037142  005037  003426                  CLR     E.B0
007594  037146  012737  003720  003430          MOV     #<D.FWD!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
007595  037154  012737  000001  003432          MOV     #1,E.B1
007596
007597  037162  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
007598  037166  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
007599  037170  104203                          ERROR   203             ;MSG A0 ERROR DURING SEEK CMD
007600  037172  104204                          ERROR   204             ;MSG B0 ERROR
007601  037174  104205                          ERROR   205             ;MSG A1 ERROR
007602  037176  104206                          ERROR   206             ;MSG B1 ERROR
007603
007604  037200  012737  040646  001176  2$:     MOV     #12$,$ESCAPE
007605  037206  013737  001424  003372          MOV     T5000,TEMP1     ;SETUP  TIMEOUT
007606
007607  037214  004737  044606                  JSR     PC,FATT2        ;FIND ATTN
007608  037220  104132                          ERROR   132             ;NO ATTN AFTER SEEK CMD
007609  037222  032737  100000  003334          BIT     #CERR,HCS1
007610  037230  001401                          BEQ     64$
007611  037232  104210                          ERROR   210             ;CERR AFTER SEEK CMD
007612  037234                          64$:
007613
007614  037234  012737  050340  003424          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
007615  037242  005037  003426                  CLR     E.B0            ;EXPECTED MSG B0
007616  037246  012737  001720  003430          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
007617  037254  012737  000001  003432          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
007618  037262  005037  003434                  CLR     E.A2            ;EXPECTED MSG A2
007619  037266  012737  000002  003436          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
007620  037274  012737  000003  003442          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
007621
007622  037302  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
007623  037306  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
```

```
7624  037310  104133                        ERROR   133             ;MSG A0 ERROR AFTER SEEK CMD
7625  037312  104134                        ERROR   134             ;MSG B0 ERROR
7626  037314  104135                        ERROR   135             ;MSG A1 ERROR
7627  037316  104136                        ERROR   136             ;MSG B1 ERROR
7628  037320  005737  001362                TST     CYLDIF
7629  037324  001401                        BEQ     65$
7630  037326  104137                        ERROR   137             ;CYL DIFF NOT CLEARED AFTER SEEK CMD
7631
7632  037330                          65$:
7633
7634  037330  012765  100000  000000        MOV     #CCLR,RKCS1(R5)
7635  037336  013765  001222  000010        MOV     $UNIT,RKCS2(R5) ;DRIVE#
7636  037344  012765  000005  000000        MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
7637  037352  013737  001414  003372        MOV     T10,TEMP1
7638  037360  004737  044176                JSR     PC,FRDY         ;FIND RDY
7639  037364  104151                        ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
7640  037366  004737  044460                JSR     PC,TSTATN       ;TEST FOR ATTN
7641  037372  000401                        BR      66$
7642  037374  104154                        ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
7643  037376                          66$:
7644
7645  037376  012737  010340  003424        MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG AC
7646  037404  005037  003426                CLR     E.B0            ;EXPECTED MSG B0
7647  037410  012737  001720  003430        MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
7648  037416  012737  000001  003432        MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
7649  037424  005037  003434                CLR     E.A2            ;EXPECTED MSG A2
7650  037430  012737  000002  003436        MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
7651  037436  012737  000003  003442        MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
7652
7653  037444  004737  044720                JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
7654  037450  000003                        .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
7655  037452  104273                        ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
7656  037454  104265                        ERROR   265             ;MSG B0 ERROR
7657  037456  104274                        ERROR   274             ;MSG A1 ERROR
7658  037460  104266                        ERROR   266             ;MSG B1 ERROR
7659
7660  037462  023737  001364  001352        CMP     CYLADD,TOCYL
7661  037470  001401                        BEQ     3$
7662  037472  104207                        ERROR   207             ;CYL ADDR IN RKMR3 NOT=RKDC
7663
7664  037474                          3$:
7665  037474  104415                        SCOP1
7666  037476  012706  001100                MOV     #STACK,SP       ;RESTORE STK PTR
7667
7668  037502  004737  046106                JSR     PC,SUBCLR
7669  037506  104024                        ERROR   24              ;CERR AFTER SCLR
7670
7671  037510  005037  001176                CLR     $ESCAPE
7672  037514  013765  001352  000020        MOV     TOCYL,RKDC(R5)  ;CYL #
7673
7674
7675  037522  012700  001674                MOV     #RHTAB,R0
7676  037526  012765  000025  000000        MOV     #<RDHEAD>,RKCS1(R5)     ;READ HEADER CMD
7677  037534  013737  001426  003372        MOV     TS0000,TEMP1    ;SETUP  TIMEOUT
7678  037542  004737  044176                JSR     PC,FRDY         ;FIND RDY
7679  037546  104171                        ERROR   171             ;NO RDY AFTER READ HEADER CMD
```

```
7680  037550  032737  100000  003334          BIT     #CERR,HCS1
7681  037556  001405                          BEQ     68$
7682  037560  104174                          ERROR   174             ;CERR AFTER READ HEADER CMD
7683  037562  104401  056606                  TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
7684  037566  000137  043470                  JMP     $EOP            ;ABORT DRIVE
7685
7686  037572  016520  000024          68$:    MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
7687  037576  016520  000024                  MOV     RKDB(R5),(R0)+  ;2'ND WORD
7688  037602  016520  000024                  MOV     RKDB(R5),(R0)+  ;3'RD WORD
7689
7690
7691  037606  032765  100000  000010          BIT     #DLT,RKCS2(R5)
7692  037614  001407                          BEQ     69$
7693  037616  004737  045534                  JSR     PC,GSTAT
7694  037622  104173                          ERROR   173             ;DLT AFTER READ HEADER CMD
7695  037624  104401  056606                  TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
7696  037630  000137  043470                  JMP     $EOP            ;ABORT DRIVE
7697  037634                          69$:
7698
7699  037634  023737  001674  001352          CMP     RHTAB,TOCYL     ;CHECK WORD 0 (CYL#) ONLY
7700  037642  001401                          BEQ     67$             ;BR IF SAME
7701  037644  104310                          ERROR   310             ;READ CYL WORD HEADER ERROR
7702  037646                          67$:
7703
7704
7705  037646  104415                          SCOP1
7706  037650  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
7707
7708  037654  004737  046106                  JSR     PC,SUBCLR
7709  037660  104024                          ERROR   24              ;CERR AFTER SCLR
7710
7711  037662  012737  040666  001176          MOV     #14$,$ESCAPE
7712  037670  013765  001350  000020          MOV     FRCYL,RKDC(R5)  ;RETURN TO CYL #
7713  037676  013737  001350  001354          MOV     FRCYL,CCYL      ;CURRENT CYL FOR TRUERROR ROUTINE
7714
7715  037704  012765  000017  000000          MOV     #SEEK,RKCS1(R5) ;SEEK CMD
7716  037712  013737  001414  003372          MOV     T10,TEMP1       ;SETUP  TIMEOUT
7717  037720  004737  044176                  JSR     PC,FRDY         ;FIND RDY
7718  037724  104131                          ERROR   131             ;NO RDY AFTER SEEK CMD
7719  037726  012737  030140  003424          MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
7720  037734  005037  003426                  CLR     E.B0
7721  037740  012737  005720  003430          MOV     #<D.REV!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
7722  037746  012737  000001  003432          MOV     #1,E.B1
7723
7724  037754  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
7725  037760  000003                          .WORD   T.A2!T.B2!0             ;& MSG$ SPECIFIED HERE
7726  037762  104203                          ERROR   203             ;MSG A0 ERROR DURING SEEK CMD
7727  037764  104204                          ERROR   204             ;MSG B0 ERROR
7728  037766  104205                          ERROR   205             ;MSG A1 ERROR
7729  037770  104206                          ERROR   206             ;MSG B1 ERROR
7730
7731
7732  037772  012737  040706  001176  4$:     MOV     #16$,$ESCAPE
7733  040000  013737  001424  003372          MOV     T5000,TEMP1     ;SETUP  TIMEOUT
7734
7735  040006  004737  044606                  JSR     PC,FATT2        ;FIND ATTN
```

```
7736  040012  104132                        ERROR   132             ;NO ATTN AFTER SEEK CMD
7737  040014  032737  100000  003334        BIT     #CERR,HCS1
7738  040022  001401                        BEQ     70$
7739  040024  104210                        ERROR   210             ;CERR AFTER SEEK CMD
7740  040026                        70$:
7741
7742  040026  012737  050340  003424        MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
7743  040034  005037  003426                CLR     E.B0            ;EXPECTED MSG B0
7744  040040  012737  001720  003430        MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
7745  040046  012737  000001  003432        MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
7746  040054  005037  003434                CLR     E.A2            ;EXPECTED MSG A2
7747  040060  012737  000002  003436        MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
7748  040066  012737  000003  003442        MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
7749
7750  040074  004737  044720                JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
7751  040100  000003                        .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
7752  040102  104133                        ERROR   133             ;MSG A0 ERROR AFTER SEEK CMD
7753  040104  104134                        ERROR   134             ;MSG B0 ERROR
7754  040106  104135                        ERROR   135             ;MSG A1 ERROR
7755  040110  104136                        ERROR   136             ;MSG B1 ERROR
7756  040112  005737  001362                TST     CYLDIF
7757  040116  001401                        BEQ     71$
7758  040120  104137                        ERROR   137             ;CYL DIFF NOT CLEARED AFTER SEEK CMD
7759
7760  040122                        71$:
7761
7762  040122  012765  100000  000000        MOV     #CCLR,RKCS1(R5)
7763  040130  013765  001222  000010        MOV     $UNIT,RKCS2(R5) ;DRIVE#
7764  040136  012765  000005  000000        MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
7765  040144  013737  001414  003372        MOV     T10,TEMP1
7766  040152  004737  044176                JSR     PC,FRDY         ;FIND RDY
7767  040156  104151                        ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
7768  040160  004737  044460                JSR     PC,TSTATN       ;TEST FOR ATTN
7769  040164  000401                        BR      72$
7770  040166  104154                        ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
7771  040170                        72$:
7772
7773  040170  012737  010340  003424        MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
7774  040176  005037  003426                CLR     E.B0            ;EXPECTED MSG B0
7775  040202  012737  001720  003430        MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
7776  040210  012737  000001  003432        MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
7777  040216  005037  003434                CLR     E.A2            ;EXPECTED MSG A2
7778  040222  012737  000002  003436        MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
7779  040230  012737  000003  003442        MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
7780
7781  040236  004737  044720                JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
7782  040242  000003                        .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
7783  040244  104273                        ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
7784  040246  104265                        ERROR   265             ;MSG B0 ERROR
7785  040250  104274                        ERROR   274             ;MSG A1 ERROR
7786  040252  104266                        ERROR   266             ;MSG B1 ERROR
7787
7788  040254  023737  001364  001350        CMP     CYLADD,FRCYL
7789  040262  001401                        BEQ     5$
7790  040264  104243                        ERROR   243             ;CYL ADDR IN RKMR3 NOT=RKDC
7791
```

```
 7792  040266                          5$:
 7793  040266  104415                          SCOP1
 7794  040270  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
 7795
 7796  040274  004737  046106                  JSR     PC,SUBCLR
 7797  040300  104024                          ERROR   24              ;CERR AFTER SCLR
 7798
 7799  040302  005037  001176                  CLR     $ESCAPE
 7800  040306  013765  001350  000020          MOV     FRCYL,RKDC(R5)  ;CYL #
 7801
 7802
 7803  040314  012700  001674                  MOV     #RHTAB,R0
 7804  040320  012765  000025  000000          MOV     #<RDHEAD>,RKCS1(R5)     ;READ HEADER CMD
 7805  040326  013737  001426  003372          MOV     T50000,TEMP1    ;SETUP  TIMEOUT
 7806  040334  004737  044176                  JSR     PC,FRDY         ;FIND RDY
 7807  040340  104171                          ERROR   171             ;NO RDY AFTER READ HEADER CMD
 7808  040342  032737  100000  003334          BIT     #CERR,HCS1
 7809  040350  001405                          BEQ     74$
 7810  040352  104174                          ERROR   174             ;CERR AFTER READ HEADER CMD
 7811  040354  104401  056606                  TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
 7812  040360  000137  043470                  JMP     $EOP            ;ABORT DRIVE
 7813
 7814  040364  016520  000024          74$:    MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
 7815  040370  016520  000024                  MOV     RKDB(R5),(R0)+  ;2'ND WORD
 7816  040374  016520  000024                  MOV     RKDB(R5),(R0)+  ;3'RD WORD
 7817
 7818
 7819  040400  032765  100000  000010          BIT     #DLT,RKCS2(R5)
 7820  040406  001407                          BEQ     75$
 7821  040410  004737  045534                  JSR     PC,GSTAT
 7822  040414  104173                          ERROR   173             ;DLT AFTER READ HEADER CMD
 7823  040416  104401  056606                  TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
 7824  040422  000137  043470                  JMP     $EOP            ;ABORT DRIVE
 7825  040426                          75$:
 7826
 7827  040426  023737  001674  001350          CMP     RHTAB,FRCYL     ;CHECK WORD 0 (CYL#) ONLY
 7828  040434  001401                          BEQ     73$             ;BR IF SAME
 7829  040436  104311                          ERROR   311             ;READ CYL WORD HEADER ERROR
 7830  040440                          73$:
 7831
 7832
 7833  040440  023727  001352  000632          CMP     TOCYL,#410.     ;ALL CYL DONE?
 7834  040446  001404                          BEQ     6$              ;BR IF YES
 7835  040450  005237  001352                  INC     TOCYL           ;ELSE DO ANOTHER
 7836  040454  000137  037032                  JMP     1$
 7837  040460                          6$:
 7838  040460  004737  050036                  JSR     PC,SWTST        ;SEE IF SW 14 OR 8 IS SET
 7839  040464  000520                          BR      TST41           ;GO TO NEXT TEST
 7840                                          ;RETURN HERE IF SW 14 IS SET OR
 7841                                          ;SW 8 WITH SWR <7:0> APPLY
 7842  040466                          8$:
 7843
 7844  040466  004737  046106                  JSR     PC,SUBCLR
 7845  040472  104024                          ERROR   24              ;CERF AFTER SCRL
 7846
 7847  040474  013765  001352  000020  76$:    MOV     TOCYL,RKDC(R5)  ;CYL#
```

```
7848
7849  040502  012765  000017  000000          MOV     #SEEK,RKCS1(R5) ;SEEK CMD TO RECONDITION DRIVE.
7850  040510  013737  001414  003372          MOV     T10,TEMP1       ;SETUP TIMEOUT
7851  040516  004737  044176                  JSR     PC,FRDY         ;FIND RDY
7852  040522  104131                          ERROR   131             ;NO RDY AFTER SEEK CMD.
7853
7854  040524  013737  001424  003372          MOV     T5000,TEMP1
7855  040532  004737  044606                  JSR     PC,FATT2        ;FIND ATTN
7856  040536  104132                          ERROR   132             ;NO ATTN AFTER SEEK CMD
7857  040540  032737  100000  003334          BIT     #CERR,HCS1
7858  040546  001401                          BEQ     78$
7859  040550  104210                          ERROR   210             ;CERR AFTER SEEK CMD.
7860
7861  040552  004737  046106          78$:    JSR     PC,SUBCLR
7862  040556  104024                          ERROR   24              ;CERR AFTER SCLR
7863
7864  040560  023727  001352  000000          CMP     TOCYL,#0        ;ALL CYL DONE?
7865  040566  001403                          BEQ     77$             ;BR IF YES
7866  040570  005337  001352                  DEC     TOCYL           ;ELSE DO ANOTHER
7867  040574  000737                          BR      76$
7868
7869  040576  004737  046106          77$:    JSR     PC,SUBCLR
7870  040602  104024                          ERROR   24              ;CERR AFTER SCLR
7871
7872  040604  005037  001176                  CLR     $ESCAPE
7873  040610  005737  001410                  TST     LPFLG
7874  040614  001402                          BEQ     79$
7875  040616  000177  140266                  JMP     @$LPERR         ;SW 9 WAS SET.
7876  040622  000177  140260          79$:    JMP     @$LPADR         ;SW 14 OR 8 WAS SET
7877
7878  040626                          10$:
7879  040626  005237  001410                  INC     LPFLG
7880  040632  032777  001000  140300          BIT     #SW9,@SWR       ;LOOP ON ERROR?
7881  040640  001312                          BNE     8$              ;YES, RECONDITION DRIVE
7882  040642  000137  037200                  JMP     2$              ;RETURN TO MAINLINE
7883  040646                          12$:
7884  040646  005237  001410                  INC     LPFLG
7885  040652  032777  001000  140260          BIT     #SW9,@SWR       ;LOOP ON ERROR?
7886  040660  001302                          BNE     8$              ;YES, RECONDITION DRIVE
7887  040662  000137  037474                  JMP     3$              ;RETURN TO MAINLINE
7888  040666                          14$:
7889  040666  005237  001410                  INC     LPFLG
7890  040672  032777  001000  140240          BIT     #SW9,@SWR       ;LOOP ON ERROR?
7891  040700  001272                          BNE     8$              ;YES, RECONDITION DRIVE
7892  040702  000137  037772                  JMP     4$              ;RETURN TO MAINLINE
7893  040706                          16$:
7894  040706  005237  001410                  INC     LPFLG
7895  040712  032777  001000  140220          BIT     #SW9,@SWR       ;LOOP ON ERROR?
7896  040720  001262                          BNE     8$              ;YES, RECONDITION DRIVE
7897  040722  000137  040266                  JMP     5$              ;RETURN TO MAINLINE
7898
7899                                  ;;*****************************************************************
7900                                  ;*TEST 41       SEEK TO ALL CYLS FROM CYL 410 & READ HEADERS
7901                                  ;;*****************************************************************
7902  040726  000004                  TST41:  SCOPE
7903  040730  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
```

```
 7904  040736  012706  001100          MOV     #STACK,SP       ;RESTORE STK PTR
 7905
 7906
 7907  040742  004737  046106          JSR     PC,SUBCLR
 7908  040746  104024                  ERROR   24              ;CERR AFTER SCLR
 7909
 7910  040750  012765  000632  000020  MOV     #410.,RKDC(R5)  ;QUICK SEEK TO CYL 410
 7911
 7912  040756  012765  000017  000000  MOV     #SEEK,RKCS1(R5) ;SEEK CMD TO RECONDITION DRIVE.
 7913  040764  013737  001414  003372  MOV     T10,TEMP1       ;SETUP TIMEOUT
 7914  040772  004737  044176          JSR     PC,FRDY         ;FIND RDY
 7915  040776  104131                  ERROR   131             ;NO RDY AFTER SEEK CMD.
 7916
 7917  041000  013737  001424  003372  MOV     T5000,TEMP1
 7918  041006  004737  044606          JSR     PC,FATT2        ;FIND ATTN
 7919  041012  104132                  ERROR   132             ;NO ATTN AFTER SEEK CMD
 7920  041014  032737  100000  003334  BIT     #CERR,HCS1
 7921  041022  001401                  BEQ     64$
 7922  041024  104210                  ERROR   210             ;CERR AFTER SEEK CMD.
 7923
 7924  041026  004737  046106  64$:    JSR     PC,SUBCLR
 7925  041032  104024                  ERROR   24              ;CERR AFTER SCLR
 7926
 7927
 7928  041034  012737  000632  001350  MOV     #410.,FRCYL     ;SETUP FROM CYL
 7929  041042  012737  000631  001352  MOV     #409.,TOCYL     ;SETUP TO CYL
 7930
 7931  041050                  1$:
 7932  041050  104415                  SCOP1
 7933  041052  012706  001100          MOV     #STACK,SP       ;RESTORE STK PTR
 7934
 7935  041056  004737  046106          JSR     PC,SUBCLR
 7936  041062  104024                  ERROR   24              ;CERR AFTER SCLR
 7937
 7938  041064  012737  042644  001176  MOV     #10$,$ESCAPE
 7939  041072  013737  001350  003376  MOV     FRCYL,TEMP3     ;SETUP
 7940  041100  013737  001352  003400  MOV     TOCYL,TEMP4     ;CYL DIFF
 7941  041106  163737  003400  003376  SUB     TEMP4,TEMP3     ;FOR
 7942  041114  013737  003376  001360  MOV     TEMP3,CALDIF    ;ERROR PRINTOUT
 7943
 7944  041122  013765  001352  000020  MOV     TOCYL,RKDC(R5)  ;GO TO CYL #
 7945
 7946  041130  012765  000017  000000  MOV     #SEEK,RKCS1(R5) ;SEEK CMD
 7947  041136  013737  001414  003372  MOV     T10,TEMP1       ;SETUP  TIMEOUT
 7948  041144  004737  044176          JSR     PC,FRDY         ;FIND RDY
 7949  041150  104131                  ERROR   131             ;NO RDY AFTER SEEK CMD
 7950  041152  012737  030140  003424  MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
 7951  041160  005037  003426          CLR     E.B0
 7952  041164  012737  005720  003430  MOV     #<D.REV!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
 7953  041172  012737  000001  003432  MOV     #1,E.B1
 7954
 7955  041200  004737  044720          JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
 7956  041204  000003                  .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
 7957  041206  104203                  ERROR   203             ;MSG A0 ERROR DURING SEEK CMD
 7958  041210  104204                  ERROR   204             ;MSG B0 ERROR
 7959  041212  104205                  ERROR   205             ;MSG A1 ERROR
```

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 7960  041214  104206                          ERROR   206             ;MSG B1 ERROR
 7961
 7962  041216  012737  042664  001176  2$:     MOV     #12$,$ESCAPE
 7963  041224  013737  001424  003372          MOV     T5000,TEMP1     ;SETUP  TIMEOUT
 7964
 7965  041232  004737  044606                  JSR     PC,FATT2        ;FIND ATTN
 7966  041236  104132                          ERROR   132             ;NO ATTN AFTER SEEK CMD
 7967  041240  032737  100000  003334          BIT     #CERR,HCS1
 7968  041246  001401                          BEQ     65$
 7969  041250  104210                          ERROR   210             ;CERR AFTER SEEK CMD
 7970  041252                          65$:
 7971
 7972  041252  012737  050340  003424          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
 7973  041260  005037  003426                  CLR     E.B0            ;EXPECTED MSG B0
 7974  041264  012737  001720  003430          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
 7975  041272  012737  000001  003432          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
 7976  041300  005037  003434                  CLR     E.A2            ;EXPECTED MSG A2
 7977  041304  012737  000002  003436          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
 7978  041312  012737  000003  003442          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
 7979
 7980  041320  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
 7981  041324  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
 7982  041326  104133                          ERROR   133             ;MSG A0 ERROR AFTER SEEK CMD
 7983  041330  104134                          ERROR   134             ;MSG B0 ERROR
 7984  041332  104135                          ERROR   135             ;MSG A1 ERROR
 7985  041334  104136                          ERROR   136             ;MSG B1 ERROR
 7986  041336  005737  001362                  TST     CYLDIF
 7987  041342  001401                          BEQ     66$
 7988  041344  104137                          ERROR   137             ;CYL DIFF NOT CLEARED AFTER SEEK CMD
 7989
 7990  041346                          66$:
 7991
 7992  041346  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
 7993  041354  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
 7994  041362  012765  000005  000000          MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
 7995  041370  013737  001414  003372          MOV     T10,TEMP1
 7996  041376  004737  044176                  JSR     PC,FRDY         ;FIND RDY
 7997  041402  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
 7998  041404  004737  044460                  JSR     PC,TSTATN       ;TEST FOR ATTN
 7999  041410  000401                          BR      67$
 8000  041412  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
 8001  041414                          67$:
 8002
 8003  041414  012737  010340  003424          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0       ;EXPECTED MSG A0
 8004  041422  005037  003426                  CLR     E.B0            ;EXPECTED MSG B0
 8005  041426  012737  001720  003430          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1        ;EXPECTED A1
 8006  041434  012737  000001  003432          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
 8007  041442  005037  003434                  CLR     E.A2            ;EXPECTED MSG A2
 8008  041446  012737  000002  003436          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
 8009  041454  012737  000003  003442          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
 8010
 8011  041462  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
 8012  041466  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
 8013  041470  104273                          ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
 8014  041472  104265                          ERROR   265             ;MSG B0 ERROR
 8015  041474  104274                          ERROR   274             ;MSG A1 ERROR
```

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 8016  041476  104266                          ERROR   266             ;MSG B1 ERROR
 8017
 8018  041500  023737  001364  001352          CMP     CYLADD,TOCYL
 8019  041506  001401                          BEQ     3$
 8020  041510  104207                          ERROR   207             ;CYL ADDR IN RKMR2 NOT=RKDC
 8021
 8022  041512                          3$:
 8023  041512  104415                          SCOP1
 8024  041514  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
 8025
 8026  041520  004737  046106                  JSR     PC,SUBCLR
 8027  041524  104024                          ERROR   24              ;CERR AFTER SCLR
 8028
 8029  041526  005037  001176                  CLR     $ESCAPE
 8030  041532  013765  001352  000020          MOV     TOCYL,RKDC(R5)  ;CYL #
 8031
 8032
 8033  041540  012700  001674                  MOV     #RHTAB,R0
 8034  041544  012765  000025  000000          MOV     #<RDHEAD>,RKCS1(R5)     ;READ HEADER CMD
 8035  041552  013737  001426  003372          MOV     T50000,TEMP1    ;SETUP  TIMEOUT
 8036  041560  004737  044176                  JSR     PC,FRDY         ;FIND RDY
 8037  041564  104171                          ERROR   171             ;NO RDY AFTER READ HEADER CMD
 8038  041566  032737  100000  003334          BIT     #CERR,HCS1
 8039  041574  001405                          BEQ     69$
 8040  041576  104174                          ERROR   174             ;CERR AFTER READ HEADER CMD
 8041  041600  104401  056606                  TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
 8042  041604  000137  043470                  JMP     $EOP            ;ABORT DRIVE
 8043
 8044  041610  016520  000024          69$:    MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
 8045  041614  016520  000024                  MOV     RKDB(R5),(R0)+  ;2'ND WORD
 8046  041620  016520  000024                  MOV     RKDB(R5),(R0)+  ;3'RD WORD
 8047
 8048
 8049  041624  032765  100000  000010          BIT     #DLT,RKCS2(R5)
 8050  041632  001407                          BEQ     70$
 8051  041634  004737  045534                  JSR     PC,GSTAT
 8052  041640  104173                          ERROR   173             ;DLT AFTER READ HEADER CMD
 8053  041642  104401  056606                  TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
 8054  041646  000137  043470                  JMP     $EOP            ;ABORT DRIVE
 8055  041652                          70$:
 8056
 8057  041652  023737  001674  001352          CMP     RHTAB,TOCYL     ;CHECK WORD 0 (CYL#) ONLY
 8058  041660  001401                          BEQ     68$             ;BR IF SAME
 8059  041662  104310                          ERROR   310             ;READ CYL WORD HEADER ERROR
 8060  041664                          68$:
 8061
 8062
 8063  041664  104415                          SCOP1
 8064  041666  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
 8065
 8066  041672  004737  046106                  JSR     PC,SUBCLR
 8067  041676  104024                          ERROR   24              ;CERR AFTER SCLR
 8068
 8069  041700  012737  042704  001176          MOV     #14$,$ESCAPE
 8070  041706  013765  001350  000020          MOV     FRCYL,RKDC(R5)  ;RETURN TO CYL #
 8071  041714  013737  001350  001354          MOV     FRCYL,CCYL      ;CURRENT CYL FOR TRUERROR ROUTINE
```

```
8072
8073  041722  012765  000017  000000          MOV     #SEEK,RKCS1(R5) ;SEEK CMD
8074  041730  013737  001414  003372          MOV     T10,TEMP1       ;SETUP  TIMEOUT
8075  041736  004737  044176                  JSR     PC,FRDY         ;FIND RDY
8076  041742  104131                          ERROR   131             ;NO RDY AFTER SEEK CMD
8077  041744  012737  030140  003424          MOV     #<D.PIP!D.SPIN!D.VV!D.DRA>,E.A0 ;EXPECTED A0
8078  041752  005037  003426                  CLR     E.B0
8079  041756  012737  003720  003430          MOV     #<D.FWD!D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
8080  041764  012737  000001  003432          MOV     #1,E.B1
8081
8082  041772  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
8083  041776  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
8084  042000  104203                          ERROR   203             ;MSG A0 ERROR DURING SEEK CMD
8085  042002  104204                          ERROR   204             ;MSG B0 ERROR
8086  042004  104205                          ERROR   205             ;MSG A1 ERROR
8087  042006  104206                          ERROR   206             ;MSG B1 ERROR
8088
8089
8090  042010  012737  042724  001176  4$:     MOV     #16$,$ESCAPE
8091  042016  013737  001424  003372          MOV     T5000,TEMP1     ;SETUP  TIMEOUT
8092
8093  042024  004737  044606                  JSR     PC,FATT2        ;FIND ATTN
8094  042030  104132                          ERROR   132             ;NO ATTN AFTER SEEK CMD
8095  042032  032737  100000  003334          BIT     #CERR,HCS1
8096  042040  001401                          BEQ     71$
8097  042042  104210                          ERROR   210             ;CERR AFTER SEEK CMD
8098  042044                          71$:
8099
8100  042044  012737  050340  003424          MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED MSG A0
8101  042052  005037  003426                  CLR     E.B0            ;EXPECTED MSG B0
8102  042056  012737  001720  003430          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
8103  042064  012737  000001  003432          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
8104  042072  005037  003434                  CLR     E.A2            ;EXPECTED MSG A2
8105  042076  012737  000002  003436          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
8106  042104  012737  000003  003442          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
8107
8108  042112  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
8109  042116  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
8110  042120  104133                          ERROR   133             ;MSG A0 ERROR AFTER SEEK CMD
8111  042122  104134                          ERROR   134             ;MSG B0 ERROR
8112  042124  104135                          ERROR   135             ;MSG A1 ERROR
8113  042126  104136                          ERROR   136             ;MSG B1 ERROR
8114  042130  005737  001362                  TST     CYLDIF
8115  042134  001401                          BEQ     72$
8116  042136  104137                          ERROR   137             ;CYL DIFF NOT CLEARED AFTER SEEK CMD
8117
8118  042140                          72$:
8119
8120  042140  012765  100000  000000          MOV     #CCLR,RKCS1(R5)   . .
8121  042146  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
8122  042154  012765  000005  000000          MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
8123  042162  013737  001414  003372          MOV     T10,TEMP1
8124  042170  004737  044176                  JSR     PC,FRDY         ;FIND RDY
8125  042174  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
8126  042176  004737  044460                  JSR     PC,TSTATN       ;TEST FOR ATTN
8127  042202  000401                          BR      73$
```

```
 8128  042204  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
 8129  042206                          73$:
 8130
 8131  042206  012737  010340  003424          MOV     #<0!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0      ;EXPECTED MSG A0
 8132  042214  005037  003426                  CLR     E.B0            ;EXPECTED MSG B0
 8133  042220  012737  001720  003430          MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1       ;EXPECTED A1
 8134  042226  012737  000001  003432          MOV     #1,E.B1         ;MSG ID FOR EXPECTED MSG B1
 8135  042234  005037  003434                  CLR     E.A2            ;EXPECTED MSG A2
 8136  042240  012737  000002  003436          MOV     #2,E.B2         ;MSG ID FOR EXPECTED MSG B2
 8137  042246  012737  000003  003442          MOV     #3,E.B3         ;MSG ID FOR EXPECTED MSG B3
 8138
 8139  042254  004737  044720                  JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
 8140  042260  000003                          .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
 8141  042262  104273                          ERROR   273             ;MSG A0 ERROR AFTER DRIVE CLEAR CMD
 8142  042264  104265                          ERROR   265             ;MSG B0 ERROR
 8143  042266  104274                          ERROR   274             ;MSG A1 ERROR
 8144  042270  104266                          ERROR   266             ;MSG B1 ERROR
 8145
 8146  042272  023737  001364  001350          CMP     CYLADD,FRCYL
 8147  042300  001401                          BEQ     5$
 8148  042302  104243                          ERROR   243             ;CYL ADDR IN RKMR3 NOT=RKDC
 8149
 8150  042304                          5$:
 8151  042304  104415                          SCOP1
 8152  042306  012706  001100                  MOV     #STACK,SP       ;RESTORE STK PTR
 8153
 8154  042312  004737  046106                  JSR     PC,SUBCLR
 8155  042316  104024                          ERROR   24              ;CERR AFTER SCLR
 8156
 8157  042320  005037  001176                  CLR     $ESCAPE
 8158  042324  013765  001350  000020          MOV     FRCYL,RKDC(R5)  ;CYL #
 8159
 8160
 8161  042332  012700  001674                  MOV     #RHTAB,R0
 8162  042336  012765  000025  000000          MOV     #<RDHEAD>,RKCS1(R5)     ;READ HEADER CMD
 8163  042344  013737  001426  003372          MOV     T50000,TEMP1    ;SETUP TIMEOUT
 8164  042352  004737  044176                  JSR     PC,FRDY         ;FIND RDY
 8165  042356  104171                          ERROR   171             ;NO RDY AFTER READ HEADER CMD
 8166  042360  032737  100000  003334          BIT     #CERR,HCS1
 8167  042366  001405                          BEQ     75$
 8168  042370  104174                          ERROR   174             ;CERR AFTER READ HEADER CMD
 8169  042372  104401  056606                  TYPE    ,MSG18          ;ABORT BALANCE OF TESTS
 8170  042376  000137  043470                  JMP     $EOP            ;ABORT DRIVE
 8171
 8172  042402  016520  000024          75$:    MOV     RKDB(R5),(R0)+  ;1'ST WORD FROM SILO TO RHTAB
 8173  042406  016520  000024                  MOV     RKDB(R5),(R0)+  ;2'ND WORD
 8174  042412  016520  000024                  MOV     RKDB(R5),(R0)+  ;3'RD WORD
 8175
 8176
 8177  042416  032765  100000  000010          BIT     #DLT,RKCS2(R5)
 8178  042424  001407                          BEQ     76$
 8179  042426  004737  045534                  JSR     PC,GSTAT
 8180  042432  104173                          ERROR   173             ;DLT AFTER READ HEADER CMD
 8181  042434  104401  056606                  TYPE    ,MSG18          ;ABORTING BALANCE OF TESTS
 8182  042440  000137  043470                  JMP     $EOP            ;ABORT DRIVE
 8183  042444                          76$:
```

```
 8184
 8185  042444  023737  001674  001350          CMP     RHTAB,FRCYL     ;CHECK WORD 0 (CYL#) ONLY
 8186  042452  001401                          BEQ     74$             ;BR IF SAME
 8187  042454  104311                          ERROR   311             ;READ CYL WORD HEADER ERROR
 8188  042456                          74$:
 8189
 8190
 8191  042456  023727  001352  000000          CMP     TOCYL,#0        ;ALL CYL DONE?
 8192  042464  001404                          BEQ     6$              ;BR IF YES
 8193  042466  005337  001352                  DEC     TOCYL           ;ELSE DO ANOTHER
 8194  042472  000137  041050                  JMP     1$
 8195  042476                          6$:
 8196  042476  004737  050036                  JSR     PC,SWTST        ;SEE IF SW 14 OR 8 IS SET
 8197  042502  000520                          BR      TST42           ;;GO TO NEXT TEST
 8198                                                                  ;RETURN HERE IF SW 14 IS SET OR
 8199                                                                  ;SW 8 WITH SWR <7:0> APPLY
 8200  042504                          8$:
 8201
 8202  042504  004737  046136                  JSR     PC,SUBCLR
 8203  042510  104024                          ERROR   24              ;CERR AFTER SCRL
 8204
 8205  042512  013765  001352  000020  77$:    MOV     TOCYL,RKDC(R5)  ;CYL#
 8206
 8207  042520  012765  000017  000000          MOV     #SEEK,RKCS1(R5) ;SEEK CMD TO RECONDITION DRIVE.
 8208  042526  013737  001414  003372          MOV     T10,TEMP1       ;SETUP TIMEOUT
 8209  042534  004737  044176                  JSR     PC,FRDY         ;FIND RDY
 8210  042540  104131                          ERROR   131             ;NO RDY AFTER SEEK CMD.
 8211
 8212  042542  013737  001424  003372          MOV     T5000,TEMP1
 8213  042550  004737  044606                  JSR     PC,FATT2        ;FIND ATTN
 8214  042554  104132                          ERROR   132             ;NO ATTN AFTER SEEK CMD
 8215  042556  032737  100000  003334          BIT     #CERR,HCS1
 8216  042564  001401                          BEQ     79$
 8217  042566  104210                          ERROR   210             ;CERR AFTER SEEk CMD.
 8218
 8219  042570  004737  046106          79$:    JSR     PC,SUBCLR
 8220  042574  104024                          ERROR   24              ;CERR AFTER SCLR
 8221
 8222  042576  023727  001352  000632          CMP     TOCYL,#410.     ;ALL CYL DONE?
 8223  042604  001403                          BEQ     78$             ;BR IF YES
 8224  042606  005237  001352                  INC     TOCYL           ;ELSE DO ANOTHER
 8225  042612  000737                          BR      77$
 8226
 8227  042614  004737  046106          78$:    JSR     PC,SUBCLR
 8228  042620  104024                          ERROR   24              ;CERR AFTER SCLR
 8229
 8230  042622  005037  001176                  CLR     $ESCAPE
 8231  042626  005737  001410                  TST     LPFLG
 8232  042632  001402                          BEQ     80$
 8233  042634  000177  136250                  JMP     @$LPERR         ;SW 9 WAS SET.
 8234  042640  000177  136242          80$:    JMP     @$LPADR         ;SW 14 OR 8 WAS SET
 8235
 8236  042644                          10$:
 8237  042644  005237  001410                  INC     LPFLG
 8238  042650  032777  001000  136262          BIT     #SW9,@SWR       ;LOOP ON ERROR?
 8239  042656  001312                          BNE     8$              ;YES, RECONDITION DRIVE
```

```
                                T41     SEEK TO ALL CYLS FROM CYL 410 & READ HEADERS

                                        JMP     2$              ;RETURN TO MAINLINE
                                12$:
                                        INC     LPFLG
                                        BIT     #SW9,@S..R      ;LOOP ON ERROR?
                                        BNE     8$              ;YES, RECONDITION DRIVE
                                        JMP     3$              ;RETURN TO MAINLINE
                                14$:
                                        INC     LPFLG
                                        BIT     #SW9,@SWR       ;LOOP ON ERROR?
                                        BNE     8$              ;YES, RECONDITION DRIVE
                                        JMP     4$              ;RETURN TO MAINLINE
                                16$:
                                        INC     LPFLG
                                        BIT     #SW9,@SWR       ;LOOP ON ERROR?
                                        BNE     8$              ;YES, RECONDITION DRIVE
                                        JMP     5$              ;RETURN TO MAINLINE

042744                          CYLINV:


                                ;;*****************************************************************
                                ;*TEST 42       SEEK TO ALL KEY INVALID CYLS
                                ;*
                                ;*      THIS TEST VERIFIES THAT 'INV ADDR' & 'SEEK INCOMPLETE' IS
                                ;*      PRODUCED & THAT HEADS DO NOT MOVE OR UNLOAD IF AN ILLEGAL
                                ;*      CYL IS SPECIFIED IN A SEEK.
                                ;*
                                ;*      INVALID CYLS ARE 411 THRU 511 (10)  IE. 633 THRU 777 (8)
                                ;*
                                ;*      THIS TEST CHECKS KEY INVALID CYLS 411,412,416,448 & 480
                                ;*      FOR A FULL LOGIC TEST
                                ;*
                                ;;*****************************************************************
042744  000004                TST42:  SCOPE
042746  012737  000001  001174          MOV     #1,$TIMES       ;;DO 1 ITERATION
042754  012706  001100                MOV     #STACK,SP       ;RESTORE STK PTR

042760  004737  046106                JSR     PC,SUBCLR
042764  104024                        ERROR   24              ;CERR AFTER SCLR

042766  012765  000017  000000        MOV     #SEEK,RKCS1(R5) ;SEEK CMD TO RECONDITION DRIVE.
042774  013737  001414  003372        MOV     T10,TEMP1       ;SETUP TIMEOUT
043002  004737  044176                JSR     PC,FRDY         ;FIND RDY
043006  104131                        ERROR   131             ;NO RDY AFTER SEEK CMD.

043010  013737  001424  003372        MOV     T5000,TEMP1
043016  004737  044606                JSR     PC,FATT2        ;FIND ATTN
043022  104132                        ERROR   132             ;NO ATTN AFTER SEEK CMD
043024  032737  100000  003334        BIT     #CERR,HCS1
043032  001401                        BEQ     64$
043034  104210                        ERROR   210             ;CERR AFTER SEEK CMD.

043036  004737  046106        64$:    JSR     PC,SUBCLR
043042  104024                        ERROR   24              ;CERR AFTER SCLR

043044  005000                        CLR     R0
```

```
 8296  043046  005037  001350              CLR     FRCYL           ;FROM CYL 0
 8297
 8298  043052                          1$:
 8299  043052  104415                      SCOP1
 8300  043054  012706  001100              MOV     #STACK,SP       ;RESTORE STK PTR
 8301
 8302  043060  004737  046106              JSR     PC,SUBCLR
 8303  043064  104024                      ERROR   24              ;CERR AFTER SCLR
 8304
 8305  043066  016037  003304  001352      MOV     INVCYL(R0),TOCYL        ;GET INVALID CYL ADDR
 8306  043074  013737  001352  001360      MOV     TOCYL,CALDIF
 8307  043102  013765  001352  000020      MOV     TOCYL,RKDC(R5)
 8308  043110  012765  000017  000000      MOV     #SEEK,RKCS1(R5) ;SEEK CMD
 8309  043116  012737  000005  003372      MOV     #5,TEMP1        ;SETUP 100US TIMEOUT
 8310  043124  004737  044176              JSR     PC,FRDY         ;FIND RDY
 8311  043130  104131                      ERROR   131             ;NO RDY AFTER SEEK CMD
 8312  043132  004737  044460              JSR     PC,TSTATN
 8313  043136  104245                      ERROR   245             ;NO ATTN AFTER SEEK TO INV CYL
 8314
 8315  043140  032737  000040  003364      BIT     #D.IDAE,HMR3
 8316  043146  001001                      BNE     2$
 8317  043150  104246                      ERROR   246             ;IDAE NOT SET AFTER SEEK TO INVALID ADDR
 8318  043152  032737  000200  003364  2$: BIT     #D.FLT,HMR3
 8319  043160  001001                      BNE     4$
 8320  043162  104247                      ERROR   247             ;FLT NOT SET AFTER SEEK TO INV ADDR
 8321  043164  032737  020000  003362  4$: BIT     #D.PIP,HMR2
 8322  043172  001401                      BEQ     5$
 8323  043174  104250                      ERROR   250             ;PIP SET AFTER SEEK TO INV ADDR
 8324  043176  032737  040000  003362  5$: BIT     #D.DSC,HMR2
 8325  043204  001001                      BNE     6$
 8326  043206  104251                      ERROR   251             ;DSC NOT SET AFTER SEEK TO INV ADDR
 8327
 8328  043210  005237  001462          6$: INC     BYPCERR         ;BYPASS CHECKING FOR CERR IN GSTAT1
 8329  043214  012737  050340  003424      MOV     #<D.DSC!D.SPIN!D.DRDY!D.VV!D.DRA>,E.A0  ;EXPECTED A0
 8330  043222  012737  002240  003426      MOV     #<D.SKI!D.FLT!D.IDAE>,E.B0
 8331  043230  012737  001720  003430      MOV     #<D.SPOK!D.CART!D.DOOR!D.BRHM!D.SSP>,E.A1
 8332  043236  012737  000001  003432      MOV     #1,E.B1
 8333
 8334  043244  004737  044720              JSR     PC,CHKMSG       ;CHECK MSGS A0,B0,A1,B1
 8335  043250  000003                      .WORD   T.A2!T.B2!0             ;& MSGS SPECIFIED HERE
 8336  043252  104252                      ERROR   252             ;MSG A0 ERROR AFTER SEEK TO INV CYL
 8337  043254  104253                      ERROR   253             ;MSG B0 ERROR
 8338  043256  104254                      ERROR   254             ;MSG A1 ERROR
 8339  043260  104255                      ERROR   255             ;MSG B1 ERROR
 8340  043262  023737  001362  001352      CMP     CYLDIF,TOCYL
 8341  043270  001401                      BEQ     7$
 8342  043272  104256                      ERROR   256             ;CYL DIFF IN RKMR2 NOT=CYL DIF
 8343  043274  023737  001364  001352  7$: CMP     CYLADD,TOCYL
 8344  043302  001401                      BEQ     8$
 8345  043304  104257                      ERROR   257             ;CYL ADDR IN RKMR3 NOT=RKDC
 8346
 8347  043306                          8$:
 8348
 8349  043306  012765  100000  000000      MOV     #CCLR,RKCS1(R5)
 8350  043314  013765  001222  000010      MOV     $UNIT,RKCS2(R5)
 8351  043322  012765  000013  000000      MOV     #RECAL,RKCS1(R5)        ;RECAL CMD
```

```
 8352  043330  013737  001414  003372          MOV     T10,TEMP1
 8353  043336  004737  044176                  JSR     PC,FRDY         ;FIND RDY
 8354  043342  104124                          ERROR   124             ;RDY NOT FOUND AFTER RECAL CMD
 8355
 8356  043344  012765  100000  000000          MOV     #CCLR,RKCS1(R5)
 8357  043352  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
 8358  043360  012765  000005  000000          MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
 8359  043366  013737  001414  003372          MOV     T10,TEMP1
 8360  043374  004737  044176                  JSR     PC,FRDY         ;FIND RDY
 8361  043400  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
 8362  043402  004737  044460                  JSR     PC,TSTATN       ;TEST FOR ATTN
 8363  043406  000401                          BR      66$
 8364  043410  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
 8365  043412                          66$:
 8366
 8367
 8368  043412  004737  045534                  JSR     PC,GSTAT
 8369  043416  032737  000040  003364          BIT     #D.IDAE,HMR3    ;SEE IF IDAE IS CLEARED
 8370  043424  001401                          BEQ     65$             ;BR IF YES
 8371  043426  104155                          ERROR   155             ;IDAE NOT CLEARED AFTER RECAL CMD
 8372
 8373  043430  012765  100000  000000  65$:    MOV     #CCLR,RKCS1(R5)
 8374  043436  013737  001412  003374          MOV     T1,TEMP2        ;LOOK FOR ATTN FROM RECAL
 8375  043444  004737  044512                  JSR     PC,FATT1
 8376  043450  104055                          ERROR   55              ;NO ATTN AFTER RECAL CMD
 8377
 8378
 8379  043452  062700  000002                  ADD     #2,R0
 8380  043456  020027  000012                  CMP     R0,#10.
 8381  043462  001402                          BEQ     $EOP
 8382  043464  000137  043052                  JMP     1$
 8383
 8384
```

```
                                .SBTTL  END OF PASS ROUTINE

                                ;;*****************************************************************
                                ;*INCREMENT THE PASS NUMBER ($PASS)
                                ;*TYPE "END PASS #XXXXX" (WHERE XXXXX IS A DECIMAL NUMBER)
                                ;*IF THERES A MONITOR GO TO IT
                                ;*IF THERE ISN'T JUMP TO STS

043470                          $EOP:

043470  000004                         SCOPE
043472  012706  001100                 MOV     #STACK,SP
043476  005237  001220                 INC     $DEVCT          ;INCR COUNT FOR # OF DRIVES THAT ARE CHECKED
043502  023737  003454  001220         CMP     DRIVS,$DEVCT    ;ARE ALL DRIVES PRESINT TESTED?
043510  001403                         BEQ     $EOP1+2         ;BR IF YES
043512  000137  011356                 JMP     NUDRV           ;IF NOT , TEST NEXT DRIVE PRESENT
043516  000004                 $EOP1:  SCOPE
043520  005037  001102                 CLR     $TSTNM          ;;ZERO THE TEST NUMBER
043524  005037  001174                 CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
043530  005237  001216                 INC     $PASS           ;;INCREMENT THE PASS NUMBER
043534  042737  100000  001216         BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
043542  005327                         DEC     (PC)+           ;;LOOP?
043544  000001                 $EOPCT: .WORD   1
043546  003022                         BGT     $DOAGN          ;;YES
043550  012737                         MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
043552  000001                 $ENDCT: .WORD   1
043554  043544                         $EOPCT
043556  104401  043623                 TYPE    ,$ENDMG         ;;TYPE "END PASS #"
043562  013746  001216                 MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
043566  104405                         TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
043570  104401  043620                 TYPE    ,$ENULL         ;;TYPE A NULL CHARACTER
043574  013700  000042         $GET42: MOV     @#42,R0         ;;GET MONITOR ADDRESS
043600  001405                         BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
043602  000005                         RESET                   ;;CLEAR THE WORLD
043604  004710                 $ENDAD: JSR     PC,(R0)         ;;GO TO MONITOR
043606  000240                         NOP                     ;;SAVE ROOM
043610  000240                         NOP                     ;;FOR
043612  000240                         NOP                     ;;ACT11
043614                         $DOAGN:
043614  000137                         JMP     @(PC)+          ;;RETURN
043616  007740                 $RTNAD: .WORD   STS
043620     377     377     000 $ENULL: .BYTE   -1,-1,0         ;;NULL CHARACTER STRING
043623     015  042412  042116 $ENDMG: .ASCIZ  <15><12>/END PASS #/
043630  050040  051501  020123
043636  000043
```

```
 8430                                   .SBTTL  SUBROUTINES
 8431
 8432                                   ;SUBROUTINE TO CLEAR ALL FLAGS FROM DDUMP THRU DOTIM
 8433                                   ;
 8434
 8435  043640  012700  003444          CLRFLG: MOV     #DDUMP,R0
 8436  043644  012701  177757                  MOV     #-17.,R1
 8437  043650  005020                   1$:     CLR     (R0)+
 8438  043652  005201                           INC     R1
 8439  043654  001375                           BNE     1$
 8440  043656  000207                           RTS     PC
 8441
 8442                                   ;
 8443                                   ;TYPE PROGRAM ID IF FTITLE=0
 8444                                   ;
 8445
 8446  043660  005737  001344          TITLE:  TST     FTITLE
 8447  043664  001024                           BNE     1$
 8448  043666  005237  001344                   INC     FTITLE
 8449  043672  104401  055116                   TYPE    ,MSG1                   ;PROGRAM ID
 8450                                   .SBTTL  GET VALUE FOR SOFTWARE SWITCH REGISTER
 8451  043676  005737  000042                   TST     @#42                    ;;ARE WE RUNNING UNDER XXDP/ACT?
 8452  043702  001012                           BNE     64$                     ;;BRANCH IF YES
 8453  043704  123727  001230  000001           CMPB    $ENV,#1                 ;;ARE WE RUNNING UNDER APT?
 8454  043712  001406                           BEQ     64$                     ;;BRANCH IF YES
 8455  043714  023727  001140  000176           CMP     SWR,#SWREG              ;;SOFTWARE SWITCH REG SELECTED?
 8456  043722  001005                           BNE     65$                     ;;BRANCH IF NO
 8457  043724  104406                           GTSWR                           ;;GET SOFT-SWR SETTINGS
 8458  043726  000403                           BR      65$
 8459  043730  112737  000001  001134  64$:     MOVB    #1,$AUTOB               ;;SET AUTO-MODE INDICATOR
 8460  043736                           65$:
 8461  043736  000207                   1$:     RTS     PC
 8462
 8463                                   ;
 8464                                   ;ROUTINE TO INPUT DRIVE NOS. TYPED IN & SET
 8465                                   ;DRIVS, DRIV0-DRIV7 REGISTERS APPROPRIATELY
 8466                                   ;
 8467
 8468  043740  104411                   GDRVS:  RDLIN
 8469  043742  012600                           MOV     (SP)+,R0                ;GET STARTING ADDR OF ASCII STRING
 8470  043744  012701  177770                   MOV     #-8.,R1                 ;SET UP COUNT
 8471  043750  112002                   1$:     MOVB    (R0)+,R2                ;GET ASCII CHAR
 8472  043752  042702  177400                   BIC     #177400,R2              ;MASK HI BYTE
 8473  043756  012703  003456                   MOV     #DRIV0,R3               ;DRIVE FLAG ADDR
 8474  043762  012704  000060                   MOV     #60,R4
 8475
 8476  043766  020402                   2$:     CMP     R4,R2                   ;WAS TYPED CHAR 0 THRU 7?
 8477  043770  001415                           BEQ     3$                      ;BRANCH IF YES
 8478  043772  005723                           TST     (R3)+                   ;NO, INCREMENT DR FLAG ADDR
 8479  043774  005204                           INC     R4
 8480  043776  020427  000070                   CMP     R4,#70
 8481  044002  001371                           BNE     2$                      ;S/B 0-7 OR TERMINATOR
 8482  044004  005702                           TST     R2
 8483  044006  001022                           BNE     4$
 8484  044010  020127  177770                   CMP     R1,#-8.
 8485  044014  001426                           BEQ     6$                      ;DEFAULT ALL DRIVES
```

```
 8486  044016  005037  003504      7$:     CLR     SIZFLG          ;BYPASS TEST 1 (SIZING)
 8487  044022  000207                      RTS     PC              ;FOUND TERMINATOR, EXIT
 8488
 8489  044024  005213              3$:     INC     @R3             ;SET UP FLAG FOR THE DRIVE
 8490  044026  005237  003454              INC     DRIVS           ;INCREMENT TOTAL # DRIVES TO BE TESTED
 8491  044032  112002                      MOVB    (R0)+,R2        ;GET NEXT ASCII CHAR.
 8492  044034  042702  177400              BIC     #177400,R2      ;MASK
 8493  044040  022702  000054              CMP     #54,R2          ;IS IT A COMMA?
 8494  044044  001407                      BEQ     5$              ;YES, GO TO NEXT WORD.
 8495  044046  005702                      TST     R2              ;NO, IS IT A TERMINATOR?
 8496  044050  001001                      BNE     4$              ;IF NOT, SOMETHING WRONG.
 8497  044052  000761                      BR      7$              ;FOUND TERMINATOR, EXIT
 8498
 8499  044054  104401  057255      4$:     TYPE    ,EM1            ;ONLY 0-7 ALLOWED.
 8500  044060  000137  007146              JMP     PRGSRT          ;START ALL OVER
 8501
 8502  044064  005201              5$:     INC     R1              ;S/B NO MORE THAN 8 DIFF
 8503  044066  001330                      BNE     1$              ;DRIVES TYPED IN.
 8504  044070  000771                      BR      4$              ;IF NORE, HAVE ERROR.
 8505
 8506  044072  005237  003504      6$:     INC     SIZFLG          ;DO TEST 1 (SIZING)
 8507  044076  000207                      RTS     PC              ;EXIT.
 8508
 8509                                      ;
 8510                                      ;ROUTINE TO INPUT RKBAS OR DEFAULT.
 8511                                      ;
 8512
 8513  044100  104412              GBA:    RDOCT
 8514  044102  012600                      MOV     (SP)+,R0        ;GET LOW ORDER FROM STACK
 8515  044104  005700                      TST     R0
 8516  044106  001403                      BEQ     1$              ;BRANCH IF DEFAULT.
 8517  044110  010037  001264              MOV     R0,$BASE
 8518  044114  000207                      RTS     PC
 8519  044116  012737  177440  001264  1$: MOV     #177440,$BASE   ;DEFAULT VALUE
 8520  044124  000207                      RTS     PC
 8521
 8522                                      ;
 8523                                      ;ROUTINE TO INPUT RKVEC OR DEFAULT
 8524                                      ;
 8525
 8526  044126  104412              GINT:   RDOCT
 8527  044130  012600                      MOV     (SP)+,R0        ;GET LOW ORDER FROM STACK
 8528  044132  005700                      TST     R0
 8529  044134  001405                      BEQ     1$              ;BRANCH IF DEFAULT
 8530  044136  010037  001314              MOV     R0,RKVEC
 8531  044142  004737  044160      2$:     JSR     PC,SETINT
 8532  044146  000207                      RTS     PC
 8533  044150  012737  000210  001314  1$: MOV     #210,RKVEC      ;DEFAULT VALUE
 8534  044156  000771                      BR      2$
 8535
 8536                                      ;
 8537                                      ;ROUTINE TO SETUP INTERRORUPT VECTOR & PRIORITY
 8538                                      ;
 8539
 8540  044160  013700  001314      SETINT: MOV     RKVEC,R0
 8541  044164  012720  050556              MOV     #INTER,(R0)+    ;INTER ADDR TO RKVEC
```

```
8542  044170  013710  001316          MOV     RKPRI,(R0)      ;PRS TO RKVEC+2
8543  044174  000207                  RTS     PC
8544
8545
8546                                  ;
8547                                  ;ROUTINE TO FIND CONTROLLER READY (RDY) DURING A DELAY
8548                                  ;ENTER WITH A COUNT IN TEMP1
8549                                  ;RETURN IF RDY NOT PRESENT (ERROR CONDITION)
8550                                  ;RETURN +2 IF RDY PRESENT (SKIP OVER ERROR)
8551                                  ;STATUS IS OBTAINED BEFORE THE RETURN FOR EITHER CASE
8552                                  ;
8553  044176  032765  000200  000000  FRDY:   BIT     #RDY,RKCS1(R5)
8554  044204  001010                  BNE     1$
8555  044206  005337  003372          DEC     TEMP1
8556  044212  001371                  BNE     FRDY
8557  044214  004737  044332          JSR     PC,HOLD         ;STORE ALL RK611 REGS IN HOLDING REGS.
8558  044220  004737  045452          JSR     PC,CKCERR       ;CHECK FOR SPECIAL CERR
8559  044224  000207                  RTS     PC              ;NO RDY, EXIT
8560  044226  062716  000002          1$:     ADD     #2,(SP)         ;SKIP OVER ERROR
8561  044232  004737  044332          JSR     PC,HOLD
8562  044236  004737  045452          JSR     PC,CKCERR       ;CHECK FOR SPECIAL CERR
8563  044242  000207                  RTS     PC
8564
8565                                  ;
8566                                  ; ROUTINE TO FIND CONTROLLER READY & STORE DRIVE REGS ONLY
8567                                  ;
8568  044244  032765  000200  000000  FRDY1:  BIT     #RDY,RKCS1(R5)
8569  044252  001014                  BNE     1$
8570  044254  005337  003372          DEC     TEMP1
8571  044260  001371                  BNE     FRDY1
8572  044262  016537  000034  003362          MOV     RKMR2(R5),HMR2
8573  044270  016537  000036  003364          MOV     RKMR3(R5),HMR3
8574  044276  004737  045452          JSR     PC,CKCERR       ;CHECK FOR SPECIAL CERR CONDITIONS
8575  044302  000207                  RTS     PC              ;NO RDY, EXIT
8576  044304  062716  000002          1$:     ADD     #2,(SP)         ;SKIP OVER ERROR
8577  044310  016537  000034  003362          MOV     RKMR2(R5),HMR2
8578  044316  016537  000036  003364          MOV     RKMR3(R5),HMR3
8579  044324  004737  045452          JSR     PC,CKCERR       ;CHECK FOR SPECIAL CERR CONDITIONS
8580  044330  000207                  RTS     PC
8581                                  ;
8582                                  ;STORE ALL RK611 REGISTERS IN HOLDING REGS
8583                                  ;
8584
8585  044332  016537  000000  003334  HOLD:   MOV     RKCS1(R5),HCS1
8586  044340  016537  000010  003336          MOV     RKCS2(R5),HCS2
8587  044346  016537  000002  003340          MOV     RKWC(R5),HWC
8588  044354  016537  000004  003342          MOV     RKBA(R5),HBA
8589  044362  016537  000006  003344          MOV     RKDA(R5),HDA
8590  044370  016537  000012  003346          MOV     RKDS(R5),HDS
8591  044376  016537  000014  003350          MOV     RKER(R5),HER
8592  044404  016537  000016  003352          MOV     RKASOF(R5),HASOF
8593  044412  016537  000020  003354          MOV     RKDC(R5),HDC
8594  044420  016537  000026  003360          MOV     RKMR1(R5),HMR1
8595  044426  016537  000034  003362          MOV     RKMR2(R5),HMR2
8596  044434  016537  000036  003364          MOV     RKMR3(R5),HMR3
8597  044442  016537  000030  003366          MOV     RKECPS(R5),HPOS
```

```
 8598  044450  016537  000032  003370          MOV     RKECPT(R5),HPAT
 8599  044456  000207                          RTS     PC
 8600
 8601                                  ;
 8602                                  ;ROUTINE TO CHECK FOR CORRECT ATTN
 8603                                  ;RETURN IF ATTN NOT PRESENT (ERROR CONDITION)
 8604                                  ;RETURN +2 IF ATTN PRESENT (SKIP OVER ERROR)
 8605                                  ;
 8606  044460  010446                  ?STATN: MOV     R4,-(SP)        ;SAV R4
 8607  044462  013704  001222                  MOV     $UNIT,R4
 8608  044466  136437  003324  003353          BITB    ATTN(R4),HASOF+1
 8609  044474  001404                          BEQ     1$              ;BRANCH IF ATTN NOT PRESENT
 8610  044476  012604                          MOV     (SP)+,R4        ;RESTOR R4
 8611  044500  062716  000002                  ADD     #2,(SP)         ;INCR RET ADDR TO JUMP OVER ERROR.
 8612  044504  000207                          RTS     PC
 8613  044506  012604                  1$:     MOV     (SP)+,R4        ;RESTOR R4
 8614  044510  000207                          RTS     PC
 8615
 8616                                  ;
 8617                                  ;ROUTINE TO FIND ATTN WITHIN TIMES GREATER THAN 1 SEC
 8618                                  ;ENTER WITH TIME IN SECONDS IN TEMP2
 8619                                  ;RETURN IF NO ATTN (ERROR CONDITION)
 8620                                  ;RETURN +2 IF ATTN FOUND
 8621                                  ;STATUS IS OBTAINED BEFORE THE RETURN FOR EITHER CASE
 8622                                  ;
 8623
 8624  044512  010446                  FATT1:  MOV     R4,-(SP)        ;SAV R4
 8625  044514  012737  177777  003372  3$:     MOV     #-1,TEMP1
 8626  044522  013704  001222                  MOV     $UNIT,R4
 8627  044526  136465  003324  000017  1$:     BITB    ATTN(R4),RKASOF+1(R5) ;FIND CORRECT ATTN
 8628  044534  001014                          BNE     2$
 8629  044536  005337  003372                  DEC     TEMP1
 8630  044542  001371                          BNE     1$
 8631  044544  005337  003374                  DEC     TEMP2
 8632  044550  001361                          BNE     3$
 8633  044552  005065  000026                  CLR     RKMR1(R5)       ;SELECT WORD 0
 8634  044556  004737  045534                  JSR     PC,GSTAT        ;GET LATEST STATUS
 8635  044562  012604                          MOV     (SP)+,R4        ;RESTOR R4
 8636  044564  000207                          RTS     PC
 8637  044566  005065  000026          2$:     CLR     RKMR1(R5)
 8638  044572  004737  045534                  JSR     PC,GSTAT        ;GET STATUS AFTER ATTN SEEN
 8639  044576  012604                          MOV     (SP)+,R4        ;RESTOR R4
 8640  044600  062716  000002                  ADD     #2,(SP)         ;SKIP OVER ERROR
 8641  044604  000207                          RTS     PC
 8642
 8643                                  ;
 8644                                  ;ROUTINE TO FIND ATTN WITHIN 1 SEC
 8645                                  ;ENTER WITH COUNT IN TEMP1
 8646                                  ;RETURN IF NO ATTN (ERROR)
 8647                                  ;RETURN +2 IF ATTN FOUND
 8648                                  ;STATUS IS OBTAINED BEFORE THE RETURN FOR EITHER CASE
 8649                                  ;
 8650
 8651  044606  010446                  FATT2:  MOV     R4,-(SP)        ;SAV R4
 8652  044610  013704  001222          2$:     MOV     $UNIT,R4
 8653  044614  136465  003324  000017          BITB    ATTN(R4),RKASOF+1(R5)  ;FIND CORRECT ATTN
```

```
 8654  044622  001011                  BNE     1$
 8655  044624  005337  003372          DEC     TEMP1
 8656  044630  001367                  BNE     2$
 8657  044632  005065  000026          CLR     RKMR1(R5)       ;SELECT WORD 0
 8658  044636  004737  045534          JSR     PC,GSTAT        ;GET LATEST STATUS.
 8659  044642  012604                  MOV     (SP)+,R4        ;RESTOR R4
 8660  044644  000207                  RTS     PC
 8661  044646  005065  000026  1$:     CLR     RKMR1(R5)
 8662  044652  004737  045534          JSR     PC,GSTAT
 8663  044656  012604                  MOV     (SP)+,R4        ;RESTOR R4
 8664  044660  062716  000002          ADD     #2,(SP)         ;SKIP OVER ERROR
 8665  044664  000207                  RTS     PC
 8666                                  ;
 8667                                  ;ENTER WITH A COUNT IN TEMP1
 8668                                  ;THE DELAY IS APPROX 17 US/ITERATION + 12 US TO EXIT
 8669                                  ;WHEN COUNT IS 0...BASED ON AN 11/05.
 8670                                  ;
 8671  044666  005737  003372  DLY:    TST     TEMP1           ;5.6 US
 8672  044672  001403                  BEQ     1$              ;2.5 US
 8673  044674  005337  003372          DEC     TEMP1           ;6.8 US
 8674  044700  000772                  BR      DLY             ;2.5 US
 8675  044702  000207          1$:     RTS     PC              ;3.8 US
 8676                                  ;
 8677                                  ;THIS ROUTINE TYPES BYPASSED DRIVE#.  ENTER WITH DRIVE# IN R0
 8678                                  ;
 8679
 8680  044704  104401  056516  BYP:    TYPE    ,MSG14          ;BYPASS DRIVE
 8681  044710  010046                  MOV     R0,-(SP)        ;;SAVE R0 FOR TYPEOUT
 8682                                                          ;;TYPE DR#
 8683  044712  104403                  TYPOS                   ;;GO TYPE--OCTAL ASCII
 8684  044714     001                  .BYTE   1               ;;TYPE 1 DIGIT(S)
 8685  044715     000                  .BYTE   0               ;;SUPPRESS LEADING ZEROS
 8686  044716  000207                  RTS     PC
 8687                                  ;
 8688                                  ; THIS ROUTINE READS ALL MSG A&B WORDS & CHECKS THEM AS REQ'D
 8689                                  ;
 8690  044720  017637  000000  001466  CHKMSG: MOV     @(SP),CHKFLG    ;PASS MSGS TO BE TESTED
 8691  044726  062716  000002          ADD     #2,(SP)         ;BUMP RETURN ADDR TO 1ST ERROR
 8692  044732  004737  045576          JSR     PC,GSTAT1       ;GET ALL ACTUAL DRIVE & CONTR STATUS
 8693
 8694  044736  053737  001222  003424  BIS     $UNIT,E.A0      ;SET UNIT #
 8695  044744  053737  001222  003430  BIS     $UNIT,E.A1
 8696  044752  053737  001222  003434  BIS     $UNIT,E.A2
 8697  044760  053737  001222  003440  BIS     $UNIT,E.A3
 8698
 8699  044766  013746  003372          MOV     TEMP1,-(SP)     ;SAVE TEMP 1
 8700
 8701  044772  013737  003424  003372  MOV     E.A0,TEMP1
 8702  045000  004737  047732          JSR     PC,SBPAR        ;GET PARITY FOR MSG A0
 8703  045004  013737  003372  003424  MOV     TEMP1,E.A0
 8704
 8705  045012  013737  003430  003372  MOV     E.A1,TEMP1
 8706  045020  004737  047732          JSR     PC,SBPAR        ;GET PARITY FOR MSG A1
 8707  045024  013737  003372  003430  MOV     TEMP1,E.A1
 8708
 8709  045032  013737  003434  003372  MOV     E.A2,TEMP1
```

```
 8710  045040  004737  047732          JSR     PC,SBPAR        ;GET PARITY FOR MSG A2
 8711  045044  013737  003372  003434  MOV     TEMP1,E.A2
 8712
 8713  045052  013737  003426  003372  MOV     E.B0,TEMP1
 8714  045060  004737  047732          JSR     PC,SBPAR        ;GET PARITY FOR MSG B0
 8715  045064  013737  003372  003426  MOV     TEMP1,E.B0
 8716
 8717  045072  013737  003432  003372  MOV     E.B1,TEMP1
 8718  045100  004737  047732          JSR     PC,SBPAR        ;GET PARITY FOR MSG B1
 8719  045104  013737  003372  003432  MOV     TEMP1,E.B1
 8720
 8721  045112  013737  003436  003372  MOV     E.B2,TEMP1
 8722  045120  004737  047732          JSR     PC,SBPAR        ;GET PARITY FOR MSG B2
 8723  045124  013737  003372  003436  MOV     TEMP1,E.B2
 8724
 8725  045132  013737  003442  003372  MOV     E.B3,TEMP1
 8726  045140  004737  047732          JSR     PC,SBPAR        ;GET PARITY FOR MSG B3
 8727  045144  013737  003372  003442  MOV     TEMP1,E.B3
 8728
 8729  045152  012637  003372          MOV     (SP)+,TEMP1     ;RESTORE TEMP 1
 8730  045156  013737  001176  001172  MOV     $ESCAPE,$TMP5   ;SAVE ESCAPE
 8731
 8732  045164  023737  003404  003424  CMP     H.A0,E.A0       ;TEST MSG A0
 8733  045172  001411                  BEQ     2$              ;BR IF OK
 8734  045174  012737  045206  001176  MOV     #1$,$ESCAPE     ;ELSE SETUP ESCAPE
 8735  045202  011646                  MOV     (SP),-(SP)      ;COPY RET ADDR
 8736  045204  000207                  RTS     PC              ;& RETURN TO MAINLINE ERROR
 8737
 8738  045206  032777  001000  133724  1$:     BIT     #SW9,@SWR       ;RET HERE FROM MAINLINE ERROR
 8739  045214  001107                  BNE     20$             ;& BR IF LOOP ON ERROR
 8740  045216  062716  000002          2$:     ADD     #2,(SP)         ;BUMP RET ADDR TO NEXT ERROR
 8741
 8742  045222  023737  003406  003426          CMP     H.B0,E.B0       ;TEST MSG B0
 8743  045230  001411                          BEQ     5$              ;BR IF OK
 8744  045232  012737  045244  001176          MOV     #4$,$ESCAPE     ;ELSE SETUP ESCAPE
 8745  045240  011646                          MOV     (SP),-(SP)      ;COPY RET ADDR
 8746  045242  000207                          RTS     PC              ;& RETURN TO MAINLINE ERROR
 8747
 8748  045244  032777  001000  133666  4$:     BIT     #SW9,@SWR       ;RETURN HERE FROM MAINLINE ERROR
 8749  045252  001070                          BNE     20$             ;& BR IF LOOP ON ERROR
 8750  045254  062716  000002          5$:     ADD     #2,(SP)         ;BUMP RET ADDR TO NEXT ERROR
 8751
 8752  045260  023737  003410  003430          CMP     H.A1,E.A1       ;TEST MSG A1
 8753  045266  001411                          BEQ     8$              ;BR IF OK
 8754  045270  012737  045302  001176          MOV     #7$,$ESCAPE
 8755  045276  011646                          MOV     (SP),-(SP)
 8756  045300  000207                          RTS     PC
 8757
 8758  045302  032777  001000  133630  7$:     BIT     #SW9,@SWR
 8759  045310  001051                          BNE     20$
 8760  045312  062716  000002          8$:     ADD     #2,(SP)
 8761
 8762  045316  023737  003412  003432          CMP     H.B1,E.B1       ;TEST MSG B1
 8763  045324  001411                          BEQ     11$             ;BR IF OK
 8764  045326  012737  045340  001176          MOV     #10$,$ESCAPE
 8765  045334  011646                          MOV     (SP),-(SP)
```

```
 8766  045336  000207                          RTS     PC
 8767
 8768  045340  032777  001000  133572  10$:    BIT     #SW9,@SWR
 8769  045346  001032                          BNE     20$
 8770  045350  062716  000002          11$:    ADD     #2,(SP)
 8771
 8772  045354  032737  000001  001466  12$:    BIT     #T.A2,CHKFLG    ;TEST MSG A2?
 8773  045362  001402                          BEQ     13$             ;BR IF NO
 8774  045364  004737  046546                  JSR     PC,RCYLD        ;PUT INFO IN CYLDIF, DO NOT CHECK
 8775
 8776  045370  032737  000002  001466  13$:    BIT     #T.B2,CHKFLG    ;TEST MSG B2?
 8777  045376  001402                          BEQ     14$             ;BR IF NO
 8778  045400  004737  046620                  JSR     PC,RCYLA        ;PUT INFO IN CYLADD, DO NOT CHECK
 8779
 8780  045404  032737  000004  001466  14$:    BIT     #T.B3,CHKFLG    ;TEST MSG B3?
 8781  045412  001404                          BEQ     15$
 8782  045414  004737  046656                  JSR     PC,RSEC         ;PUT INFO IN SECTOR, DO NOT CHECK
 8783  045420  004737  046714                  JSR     PC,RHEAD        ;PUT INFO IN HEADA, DO NOT CHECK
 8784
 8785  045424  013737  001172  001176  15$:    MOV     $TMP5,$ESCAPE   ;RESTORE ESCAPE
 8786  045432  000207                          RTS     PC
 8787
 8788  045434  012706  001100          20$:    MOV     #STACK,SP       ;RESET STACK PTR
 8789  045440  013737  001172  001176          MOV     $TMP5,$ESCAPE   ;RESTORE ESCAPE
 8790  045446  000177  133436                  JMP     @$LPERR
```

```
 8791
```

```
8792
8793                    ;
                        ; THIS ROUTINE CHECKS FOR CERTAIN ERROR CONDITIONS ONLY
```

```
                                        ; IE: IF NED, CTO OR MDS SET, MSG A8B ARE INVALID
                                        ;
045452  005737  001462          ChkCERR: TST     BYPCERR
045456  001025                           BNE     4$
045460  032737  100000  003334          BIT     #CERR,HCS1
```

```
8799  045466  001001                        BNE     1$              ;BR IF CERR
8800  045470  000207                        RTS     PC
8801
8802  045472  032737  004000  003334  1$:   BIT     #CTO,HCS1
8803  045500  001402                        BEQ     2$              ;BR IF NOT CTO
8804  045502  104326                        ERROR   326             ;CTO ERROR, MSG A&B INVALID
8805  045504  000207                        RTS     PC
8806
8807  045506  032737  010000  003336  2$:   BIT     #NED,HCS2
```

```
 8808  045514  001401                        BEQ     3$              ;BR IF NOT NED
 8809  045516  104327                        ERROR   327             ;NED ERROR, MSG A&B INVALID
 8810
 8811  045520  032737  001000  003336  3$:   BIT     #MDS,HCS2
 8812  045526  001401                        BEQ     4$
 8813  045530  104330                        ERROR   330             ;MDS ERROR, MSG A&B INVALID
 8814
 8815  045532  000207                4$:     RTS     PC
 8816
                                        ;
                                        ;THIS ROUTINE DOES THE SELECT DRIVE CMD TO GET STATUS
                                        ;IT THEN WAITS FOR CONTROLLER  READY.
                                        ;IF RDY NOT RECEIVED BY A TIMEOUT, AN ERROR IS FLAGGED
                                        ;
 8824  045534  013746  003372        GSTAT:  MOV     TEMP1,-(SP)     ;SAVE TEMP1
 8825  045540  013765  001222  000010        MOV     $UNIT,RKCS2(R5) ;CURRENT DRIVE #
 8826  045546  012765  000001  000000        MOV     #SELDRV,RKCS1(R5)  ;GET STATUS WITH SELECT DRIVE CMD
 8827  045554  013737  001414  003372        MOV     TIO,TEMP1
 8828  045562  004737  044176                JSR     PC,$RDY         ;FIND RDY
 8829  045566  104417                        ERROR   117             ;RDY NOT SET BY END OF SELECT DRIVE CMD
 8830  045570  012637  003372                MOV     (SP)+,TEMP1     ;RESTOR TEMP1
 8831  045574  000207                        RTS     PC
 8832
```

```
                        ;
                        ; THIS ROUTINE GETS STATUS OF ALL DRIVE REGISTERS (MSG A0-A3, B0-B3,
                        ; & ALL CONTROLLER REGISTERS
```

```
8834
8835  045576  013746  003372          ;
8836  045602  004737  044332  ;STAT1: MOV     TEMP1,-(SP)      ;SAVE TEMP 1
8837  045606  012765  100000  000000          JSR     PC,HOLD          ;GET ALL CONTR REGS
8838  045614  013765  001222  000010          MOV     #CCLR,RKCS1(R5) ;CLEAR CONTR
8839  045622  012765  000003  000026          MOV     $UNIT,RKCS2(R5) ;CURRENT DRIVE #
8840  045630  012765  000001  000000          MOV     #3,RKMR1(R5)     ;SELECT WORD 3
8841  045636  013737  001414  003372          MOV     #SELDRV,RKCS1(R5)       ;GET STATUS
8842  045644  004737  044244                  MOV     T10,TEMP1
8843  045650  104117                          JSR     PC,FRDY1         ;FIND RDY & STORE DRIVE REGS ONLY
8844  045652  013737  003362  003420          ERROR   117              ;RDY NOT SET BY END OF SELECT DRV CMD
8845  045660  013737  003364  003422          MOV     HMR2,H.A3        ;STORE MSG A3
8846                                          MOV     HMR3,H.B3        ;STORE MSG B3
8847  045666  012765  100000  000000
8848  045674  013765  001222  000010          MOV     #CCLR,RKCS1(R5)
8849  045702  012765  000002  000026          MOV     $UNIT,RKCS2(R5)
8850  045710  012765  000001  000000          MOV     #2,RKMR1(R5)     ;SELECT WORD 2
8851  045716  013737  001414  003372          MOV     #SELDRV,RKCS1(R5)
8852  045724  004737  044244                  MOV     T10,TEMP1
8853  045730  104117                          JSR     PC,FRDY1         ;FIND RDY & STORE DRIVE REGS ONLY
8854  045732  013737  003362  003414          ERROR   117              ;RDY NOT SET BY END OF SELECT DRV CMD
8855  045740  013737  003364  003416          MOV     HMR2,H.A2        ;STORE MSG A2
8856                                          MOV     HMR3,H.B2        ;STORE MSG B2
8857  045746  012765  100000  000000
8858  045754  013765  001222  000010          MOV     #CCLR,RKCS1(R5)
8859  045762  012765  000001  000026          MOV     $UNIT,RKCS2(R5)
8860  045770  012765  000001  000000          MOV     #1,RKMR1(R5)     ;SELECT WORD 1
8861  045776  013737  001414  003372          MOV     #SELDRV,RKCS1(R5)
8862  046004  004737  044244                  MOV     T10,TEMP1
8863  046010  104117                          JSR     PC,FRDY1         ;FIND RDY & STORE DRIVE REGS ONLY
8864  046012  013737  003362  003410          ERROR   117              ;RDY NOT SET BY END OF SELECT DRV CMD
8865  046020  013737  003364  003412          MOV     HMR2,H.A1        ;STORE MSG A1
8866                                          MOV     HMR3,H.B1        ;STORE MSG B1
8867  046026  012765  100000  000000
8868  046034  013765  001222  000010          MOV     #CCLR,RKCS1(R5)
8869  046042  012765  000001  000000          MOV     $UNIT,RKCS2(R5)
8870  046050  013737  001414  003372          MOV     #SELDRV,RKCS1(R5)       ;SELECT WORD 0
8871  046056  004737  044244                  MOV     T10,TEMP1
8872  046062  104117                          JSR     PC,FRDY1         ;FIND RDY & STORE DRIVE REGS ONLY
8873  046064  013737  003362  003404          ERROR   117              ;RDY NOT SET BY END OF SEL DRV CMD
8874  046072  013737  003364  003406          MOV     HMR2,H.A0        ;STORE MSG A0
8875                                          MOV     HMR3,H.B0        ;STORE MSG B0
8876  046100  012637  003372                  MOV     (SP)+,TEMP1      ;RESTORE TEMP1
8877  046104  000207                          RTS     PC
8878
8879                                  ;
8880                                  ;THIS ROUTINE DOES A SUBSYSTEM CLEAR & WAITS FOR CONTROLLER READY
8881                                  ;IF RDY IS NOT RECEIVED BY THE END OF THE TIMEOUT, AN ERROR IS FLAGGED.
8882                                  ;THE ROUTINE THEN GETS CURRENT STATUS & CHECKS FOR CONTROLLER ERROR (CERR)
8883                                  ;RETURN IF CERR SET
8884                                  ;RETURN +2 IF CERR CLEAR
8885                                  ;
8886  046106  012765  000040  000010  $UBCLR: MOV     #SCLR,RKCS2(R5) ;SUBSYS CLEAR
8887  046114  013737  001414  003372          MOV     T10,TEMP1
8888  046122  004737  044176                  JSR     PC,FRDY          ;FIND RDY
8889  046126  104120                          ERROR   120              ;RDY NOT SET BY END OF SCLR
```

```
                        ;GET VALUE FOR SOFTWARE SWITCH REGISTER

8890  046130  013765  001222  000010        MOV     $UNIT,RKCS2(R5) ;CURRENT DRIVE #
8891  046136  005065  000026                CLR     RKMR1(R5)       ;SELECT WORD 0
8892  046142  004737  045534                JSR     PC,GSTAT        ;GET STATUS
8893  046146  032737  100000  003334        BIT     #CERR,#CS1      ;CHECK FOR CONT ERROR
8894  046154  001401                        BEQ     1$
8895  046156  000207                        RTS     PC
8896  046160  062716  000002        1$:     ADD     #2,(SP)         ;SKIP OVER ERROR
8897  046164  000207                        RTS     PC
8898
8899                                ;
8900                                ;READ THE SECTOR COUNT IN RKMR3, RIGHT JUSTIFY IT & STORE IT IN 'SECTOR'
8901                                ;
8902  046166  012765  000003  000C26  RDSEC:  MOV     #3,RKMR1(R5)    ;WORD 3
8903  046174  004737  045534                JSR     PC,GSTAT
8904  046200  013737  003364  001406        MOV     HMR3,SECTOR
8905  046206  042737  177017  001406        BIC     #^C<M.SECT>,SECTOR
8906  046214  006237  001406                ASR     SECTOR          ;RIGHT JUSTIFY
8907  046220  006237  001406                ASR     SECTOR          ;SECTOR
8908  046224  006237  001406                ASR     SECTOR          ;INFO
8909  046230  006237  001406                ASR     SECTOR
8910  046234  000207                        RTS     PC
8911
8912
8913                                ;
8914                                ;FIND SECTOR 0 IN 22 SECTOR FORMAT.
8915                                ;ERROR FLAGGED IF NOT FOUND BY TIMEOUT
8916                                ;
8917  046236  013746  003372       FS022:  MOV     TEMP1,-(SP)     ;SAVE TEMP1
8918  046242  013737  001424  003372        MOV     T5000,TEMP1     ;SETUP TIMEOUT
8919  046250  004737  046166        1$:     JSR     PC,RDSEC                ;READ SECTOR
8920  046254  005737  001406                TST     SECTOR          ;LOOK FOR SECTOR 0
8921  046260  001005                        BNE     2$
8922  046262  004737  046166                JSR     PC,RDSEC
8923  046266  005737  001406                TST     SECTOR
8924  046272  001406                        BEQ     3$              ;BR IF SAME TWICE
8925  046274  005337  003372        2$:     DEC     TEMP1
8926  046300  001363                        BNE     1$              ;TRY AGAIN IF TIMEOUT NOT UP
8927  046302  012637  003372                MOV     (SP)+,TEMP1     ;ELSE RESTORE TEMP1
8928  046306  000207                        RTS     PC              ;EXIT
8929  046310  012637  003372        3$:     MOV     (SP)+,TEMP1
8930  046314  062716  000002                ADD     #2,(SP)         ;SKIP OVER ERROR
8931  046320  000207                        RTS     PC
8932
8933                                ;
8934                                ;FIND NEXT SECTOR IN 22 SECTOR FORMAT
8935                                ;ERROR FLAGGED IF NOT FOUND BY TIMEOUT
8936                                ;
8937  046322  013746  003372       FNS22:  MOV     TEMP1,-(SP)     ;SAVE TEMP 1
8938  046326  013737  001420  003372        MOV     T500,TEMP1      ;SETUP TIMEOUT
8939  046334  004737  046166        1$:     JSR     PC,RDSEC                ;READ SECTOR
8940  046340  023737  001402  001406        CMP     PSEC,SECTOR
8941  046346  001406                        BEQ     3$              ;BR IF SAME
8942  046350  004737  046166                JSR     PC,RDSEC                ;ELSE TRY READ DIFFERENT TWICE
8943  046354  023737  001402  001406        CMP     PSEC,SECTOR
8944  046362  001006                        BNE     2$              ;BR IF DIFFERENT TWICE
8945  046364  005337  003372        3$:     DEC     TEMP1           ;ELSE TRY AGAIN IF TIME LEFT
```

```
8946  046370  001361                        BNE     1$
8947  046372  012637  003372                MOV     (SP)+,TEMP1     ;RESTORE TEMP 1
8948  046376  000207                        RTS     PC
8949  046400  012637  003372        2$:     MOV     (SP)+,TEMP1     ;RESTORE TEMP 1
8950  046404  062716  000002                ADD     #2,(SP)         ;SKIP OVER ERROR
8951  046410  000207                        RTS     PC
8952                                ;
8953                                ;READ THE CYL DIFF/OFFSET IN RKMR2, RIGHT JUSTIFY IT & STORE IT IN 'CYLDIF'
8954                                ;
8955  046412  012765  000002  000026  RDCYLD: MOV     #2,RKMR1(R5)    ;WORD 2
8956  046420  004737  045534                JSR     PC,GSTAT
8957  046424  013737  003362  001362        MOV     HMR2,CYLDIF
8958  046432  042737  160017  001362        BIC     #^C<M.CDIF>,CYLDIF
8959  046440  006237  001362                ASR     CYLDIF          ;RIGHT JUSTIFY
8960  046444  006237  001362                ASR     CYLDIF          ;CYL DIFF/OFFSET
8961  046450  006237  001362                ASR     CYLDIF          ;INFO
8962  046454  006237  001362                ASR     CYLDIF
8963  046460  023727  001362  000777        CMP     CYLDIF,#777     ;CHK TO SEE IF RET IN COMPL. FORM
8964  046466  001002                        BNE     1$              ;BR IF NOT
8965  046470  005037  001362                CLR     CYLDIF          ;CLR IF YES
```

```
 8966  046474  000207                    1$:     RTS     PC
 8967
 8968                                    ;READ THE CYL ADDR IN RKMR3, RIGHT JUSTIFY IT & STORE IT IN  'CYLADD'
 8969
 8970  046476  012765  000002  000026  RDCYLA: MOV     #2,RKMR1(R5)    ;WORD 2
 8971  046504  004737  045534          JSR     PC,GSTAT
 8972  046510  013737  003364  001364  MOV     HMR3,CYLADD
 8973  046516  042737  160017  001364  BIC     #^C<M.CADD>,CYLADD
 8974  046524  006237  001364          ASR     CYLADD          ;RIGHT JUSTIFY
 8975  046530  006237  001364          ASR     CYLADD          ;CYL ADDR
 8976  046534  006237  001364          ASR     CYLADD          ;INFO
 8977  046540  006237  001364          ASR     CYLADD
 8978  046544  000207                  RTS     PC
 8979
 8980                                    ; READ THE CYL DIFF/OFFSET IN H.A2, RIGHT JUSTIFY IT & STORE IT IN 'CYLDIF'
 8981
 8982  046546  013737  003414  001362  RCYLD:  MOV     H.A2,CYLDIF
 8983  046554  042737  160017  001362  BIC     #^C<M.CDIF>,CYLDIF      ;CLEAR UNWANTED INFO
 8984  046562  006237  001362          ASR     CYLDIF          ;RIGHT JUSTIFY
 8985  046566  006237  001362          ASR     CYLDIF
 8986  046572  006237  001362          ASR     CYLDIF
 8987  046576  006237  001362          ASR     CYLDIF
 8988  046602  023727  001362  000777  CMP     CYLDIF,#777     ;CHK TO SEE IF RET IN COMPL. FORM
 8989  046610  001002                  BNE     1$              ;BR IF NO
 8990  046612  005037  001362          CLR     CYLDIF          ;ELSE CLEAR
 8991  046616  000207                  1$:     RTS     PC
 8992
 8993                                    ; READ THE CYL ADDR IN H.B2, RIGHT JUSTIFY IT & STORE IT IN 'CYLADD'
 8994
 8995  046620  013737  003416  001364  RCYLA:  MOV     H.B2,CYLADD
 8996  046626  042737  160017  001364  BIC     #^C<M.CADD>,CYLADD      ;CLEAR UNWANTED INFO
 8997  046634  006237  001364          ASR     CYLADD          ;RIGHT JUSTIFY
 8998  046640  006237  001364          ASR     CYLADD
 8999  046644  006237  001364          ASR     CYLADD
 9000  046650  006237  001364          ASR     CYLADD
 9001  046654  000207                  RTS     PC
 9002
 9003                                    ; READ THE SECTOR COUNT IN H.B3, RIGHT JUSTIFY IT & STORE IT IN 'SECTOR'
 9004
 9005  046656  013737  003422  001406  RSEC:   MOV     H.B3,SECTOR
 9006  046664  042737  177017  001406  BIC     #^C<M.SECT>,SECTOR      ;CLEAR UNWANTED INFO
 9007  046672  006237  001406          ASR     SECTOR          ;RIGHT JUSTIFY
 9008  046676  006237  001406          ASR     SECTOR
 9009  046702  006237  001406          ASR     SECTOR
 9010  046706  006237  001406          ASR     SECTOR
 9011  046712  000207                  RTS     PC
 9012
 9013                                    ; READ THE HEAD ADDR IN H.B3, RIGHT IT & STORE IT IN 'HEADA'
 9014
 9015  046714  013737  003422  001432  RHEAD:  MOV     H.B3,HEADA
 9016  046722  042737  170777  001432  BIC     #^C<M.HEAD>,HEADA       ;CLEAR UNWANTED INFO
 9017  046730  006237  001432          ASR     HEADA           ;RIGHT JUSTIFY IT
 9018  046734  000337  001432          SWAB    HEADA
 9019  046740  000207                  RTS     PC
 9020
 9021                                    ;FIND LIMIT DETECT ON SEEK IN RKMR3 BEFORE TIMEOUT
```

```
                                        ;RETURN IF NOT FOUND: ERROR
                                        ;RETURN+2 IF FOUND: SKIP OVER ERROR
                                        ;
046742  005037  001460          FLIM:   CLR     LIMERROR                ;LIMIT DETECT ERROR FLAG
046746  012737  000764  003372          MOV     #500.,TEMP1     ;SETUP TIMEOUT
046754  012765  000001  000026          MOV     #1,RKMR1(R5)    ;WORD 1
046762  004737  045534          1$:     JSR     PC,GSTAT
046766  032737  020000  003364          BIT     #D.LIMD,HMR3
046774  001006                          BNE     2$              ;EXIT IF SET
046776  005337  003372                  DEC     TEMP1
047002  001367                          BNE     1$
047004  005237  001460                  INC     LIMERROR                ;SET LIMIT DETECT FLAG
047010  000207                          RTS     PC
047012  062716  000002          2$:     ADD     #2,(SP)         ;SKIP OVER ERROR
047016  000207                          RTS     PC
                                        ;
                                        ;ROUTINE TO FIND HEADS HOME IN RKMR2 WORD 1 BEFORE TIMEOUT
                                        ;ENTER WITH TIME IN SECONDS IN TEMP2
                                        ;RETURN IF NOT FOUND
                                        ;RETURN+2 IF FOUND - SKIP OVER ERROR
                                        ;
047020  012737  177777  003372  FHDHM:  MOV     #-1,TEMP1       ;ALL 1'S
047026  012765  000001  000026          MOV     #1,RKMR1(R5)    ;WORD 1
047034  004737  045534          1$:     JSR     PC,GSTAT
047040  032737  000040  003362          BIT     #D.HDHM,HMR2
047046  001007                          BNE     2$
047050  005337  003372                  DEC     TEMP1
047054  001367                          BNE     1$
047056  005337  003374                  DEC     TEMP2
047062  001356                          BNE     FHDHM
047064  000207                          RTS     PC
047066  062716  000002          2$:     ADD     #2,(SP)         ;SKIP OVER ERROR
047072  000207                          RTS     PC
                                        ;
                                        ;ROUTINE TO FIND LOAD HEADS IN RKMR2 WORD 1 BEFORE TIMEOUT
                                        ;RETURN IF NOT FOUND
                                        ;RETURN+2 IF FOUND: SKIP OVER ERROR
                                        ;
047074  012737  177777  003372  FLOAD:  MOV     #-1,TEMP1       ;SETUP TIMEOUT
047102  012765  000001  000026          MOV     #1,RKMR1(R5)    ;WORD 1
047110  004737  045534          1$:     JSR     PC,GSTAT
047114  032737  010000  003362          BIT     #D.LOAD,HMR2
047122  001004                          BNE     2$
047124  005337  003372                  DEC     TEMP1
047130  001367                          BNE     1$
047132  000207                          RTS     PC
047134  062716  000002          2$:     ADD     #2,(SP)         ;SKIP OVER ERROR
047140  000207                          RTS     PC
                                        ;
                                        ;FILL HEADER TABLE WITH 66 WORDS OF VALID HEADERS
                                        ;ENTER WITH CYL # IN 'CALADD'
                                        ;ENTER WITH HEAD # IN 'HEAD'
                                        ;ENTER WITH FORMAT IN 'FORMAT'
                                        ;
047142  010046                  FHDTAB: MOV     R0,-(SP)        ;SAV R0
047144  010146                          MOV     R1,-(SP)        ;SAV R1
```

```
 9078  047146  012700  001470            MOV     #HDTAB,R0       ;HEADER WORD TABLE ADDR
 9079  047152  005001                    CLR     R1              ;SECTOR COUNTER
 9080  047154  013737  001430  001434    MOV     HEAD,HD1
 9081  047162  006337  001434            ASL     HD1
 9082  047166  006337  001434            ASL     HD1
 9083  047172  006337  001434            ASL     HD1
 9084  047176  006337  001434            ASL     HD1
 9085  047202  006337  001434            ASL     HD1             ;SETUP HEAD # FOR WORD 2 OF HEADER
 9086  047206  013737  001436  001440    MOV     FORMAT,FMT1
 9087  047214  000337  001440            SWAB    FMT1
 9088  047220  006337  001440            ASL     FMT1            ;SETUP FORMAT FOR WORD 2 OF HEADER
 9089
 9090  047224  013720  001366    1$:     MOV     CALADD,(R0)+    ;HEADER WORD 1-CYL ADDR
 9091  047230  010110                    MOV     R1,(R0)         ;HEADER WORD 2-SECTOR NO
 9092  047232  053710  001434            BIS     HD1,(R0)        ;               -HEAD NO
 9093  047236  053710  001440            BIS     FMT1,(R0)       ;               -FORMAT
 9094  047242  005737  001464            TST     BYPFMT
 9095  047246  001403                    BEQ     2$              ;BR IF TRUE FORMAT
 9096  047250  052710  140000            BIS     #(BIT14!BIT15),(R0)     ;SET GOOD SECTOR FLAGS
 9097  047254  000402                    BR      3$
 9098  047256  004737  047336    2$:     JSR     PC,SECFLG       ;GET  SECTOR FLAGS
 9099
 9100  047262  013737  001366  003372  3$:     MOV     CALADD,TEMP1
 9101  047270  011037  003374            MOV     (R0),TEMP2
 9102  047274  043737  001366  003374    BIC     CALADD,TEMP2
 9103  047302  042037  003372            BIC     (R0)+,TEMP1
 9104  047306  053737  003372  003374    BIS     TEMP1,TEMP2
 9105  047314  013720  003374            MOV     TEMP2,(R0)+     ;HEADER WORD 3-HEADER CHECK
 9106
 9107  047320  005201                    INC     R1              ;SECTOR CTR
 9108  047322  020127  000026            CMP     R1,#22.         ;ALL 22 SECTORS DONE? (66 WORDS)
 9109  047326  001336                    BNE     1$              ;BR IF NO
 9110
 9111  047330  012601                    MOV     (SP)+,R1        ;RESTOR R1
 9112  047332  012600                    MOV     (SP)+,R0        ;RESTOR R0
 9113  047334  000207                    RTS     PC
 9114
 9115
 9116                            ;
 9117                            ; THIS ROUTINE GETS INFORMATION FROM THE BAD SECTOR TABLE FILLED BY A PREVIOUS TEST
 9118                            ; & SETS BITS 14 & 15 APPROPRIATELY.
 9119                            ;
 9120  047336  010246            SECFLG: MOV     R2,-(SP)        ;SAVE R2
 9121  047340  005737  001436            TST     FORMAT
 9122  047344  001016                    BNE     1$              ;BR IF 20 SECTOR FORMAT
 9123  047346  012702  002314            MOV     #BSE22H+8.,R2
 9124  047352  004737  047406            JSR     PC,FLGTST       ;GET HARDWARE DETECTED FLAG
 9125  047356  052710  100000            BIS     #BIT15,(R0)     ;RETURN HERE IF GOOD SECTOR
 9126
 9127  047362  012702  054762            MOV     #BSE22S+8.,R2   ;ELSE RETURN HERE
 9128  047366  004737  047406            JSR     PC,FLGTST       ;GET SOFTWARE DETECTED FLAG
 9129  047372  052710  040000            BIS     #BIT14,(R0)     ;RETURN HERE IF GOOD SECTOR
 9130
 9131  047376  012602                    MOV     (SP)+,R2        ;ELSE RETURN HERE
 9132  047400  000207                    RTS     PC
 9133
```

```
 9134  047402  012602                  1$:     MOV     (SP)+,R2        ;RESTORE R2
 9135  047404  000207                          RTS     PC
 9136
 9137                                  ;
 9138                                  ; THIS ROUTINE DOES THE ACTUAL SCANNING OF THE BAD SECTOR TABLES
 9139                                  ; ENTER WITH THE ADDRESS OF TABLE (BSE22H, BSE22S, ETC) IN TEMP1
 9140                                  ; RETURN IF NO COMPARE
 9141                                  ; RETURN +4 IF COMPARE
 9142                                  ;
 9143  047406  010346                  FLGTST: MOV     R3,-(SP)        ;SAVE R3
 9144
 9145  047410  021227  177777          1$:     CMP     (R2),#-1        ;SEE IF ALL 1'S
 9146  047414  001002                          BNE     2$              ;BR IF NO
 9147  047416  012603                          MOV     (SP)+,R3        ;RESTORE R3
 9148  047420  000207                          RTS     PC
 9149
 9150  047422  022237  001366          2$:     CMP     (R2)+,CALADD    ;SEE IF = CYL #, & ADV PTR TO TRACK/SECTOR WORD
 9151  047426  001403                          BEQ     3$
 9152  047430  062702  000002                  ADD     #2,R2           ;GO TO NEXT CYL WORD IN TABLE
 9153  047434  000765                          BR      1$
 9154
 9155  047436  013703  001430          3$:     MOV     HEAD,R3         ;GET HEAD # FROM FHDTAB ROUTINE
 9156  047442  000303                          SWAB    R3
 9157  047444  050103                          BIS     R1,R3           ;ADD SECTOR # FROM FHDTAB ROUTINE
 9158  047446  022203                          CMP     (R2)+,R3        ;SECTOR/HEAD COMPARE? & INCR TO NEXT CYL WORD
 9159  047450  001401                          BEQ     4$              ;BR IF YES
 9160  047452  000756                          BR      1$              ;TRY NEXT CYL
 9161
 9162  047454  012603                  4$:     MOV     (SP)+,R3        ;RESTORE R3
 9163  047456  062716  000004                  ADD     #4,(SP)         ;INCREMENT RET ADDR
 9164  047462  000207                          RTS     PC
 9165                                  ;
 9166                                  ;THIS ROUTINE SORTS THE RHTAB TABLE FROM WHATEVER SECTOR IT BEGINS
 9167                                  ;WITH AND RE-WRITES THE INFO IN SRTTAB TABLE TO BEGIN WITH SECTOR 0
 9168                                  ;
 9169  047464  010046                  SORT:   MOV     R0,-(SP)        ;SAVE R0
 9170  047466  010146                          MOV     R1,-(SP)        ;SAVE R1
 9171  047470  004737  046166                  JSR     PC,RDSEC
 9172  047474  062737  000001  001406          ADD     #1,SECTOR
 9173  047502  004737  047572                  JSR     PC,MULT6        ;MULT SECTOR BY 6
 9174
 9175  047506  012700  000204                  MOV     #132.,R0
 9176  047512  163700  001406                  SUB     SECTOR,R0       ;R0-SECTOR TO R0 = INDEX
 9177  047516  010037  001406                  MOV     R0,SECTOR
 9178  047522  062737  001674  001406          ADD     #RHTAB,SECTOR   ;SAVE INDEX
 9179
 9180  047530  062700  001674                  ADD     #RHTAB,R0       ;INDEX TO BOT HALF OF RHTAB
 9181  047534  012701  002100                  MOV     #SRTTAB,R1      ;INDEX TO TOP HALF OF SRTTAB
 9182
 9183  047540  012021                  1$:     MOV     (R0)+,(R1)+     ;PUT BOTTOM OF RHTAB TO TOP OF SRTTAB
 9184  047542  020027  00210C                  CMP     R0,#RHTAB+132.
 9185  047546  001374                          BNE     1$
 9186
 9187  047550  012700  001674                  MOV     #RHTAB,R0       ;PUT TOP OF RHTAB TO BOT OF SRTTAB
 9188  047554  012021                  2$:     MOV     (R0)+,(R1)+
 9189  047556  020037  001406                  CMP     R0,SECTOR
```

```
 9190  047562  001374                          BNE     2$
 9191
 9192  047564  012601                          MOV     (SP)+,R1        ;RESTOR R1
 9193  047566  012600                          MOV     (SP)+,R0        ;RESTOR R0
 9194  047570  000207                          RTS     PC
 9195
 9196                                  ;
 9197                                  ;MULT BY 6. ENTER WITH DESIRED # IN 'SECTOR'
 9198                                  ;
 9199  047572  006337  001406          MULT6:  ASL     SECTOR          ;2 X SECTOR
 9200  047576  013746  001406                  MOV     SECTOR,-(SP)
 9201  047602  006337  001406                  ASL     SECTOR          ;4 X SECTOR
 9202  047606  062637  001406                  ADD     (SP)+,SECTOR    ;(4 X S)+(2 X S) = 6 X SECTOR
 9203  047612  000207                          RTS     PC
 9204
 9205                                  ;
 9206                                  ;ROUTINE TO TURN L OR P CLOCK INTERRORUPT ON
 9207                                  ;
 9208  047614  005037  001376          CLKON:  CLR     TIMUP
 9209  047620  005737  003500                  TST     PCLKF
 9210  047624  001004                          BNE     1$              ;BRANCH IF P-CLOCK PRESENT
 9211  047626  012777  000100  131472        MOV     #100,@LKS       ;L-CLOCK, ENABLE INT
 9212  047634  000207                          RTS     PC
 9213  047636  012777  177777  131456  1$:     MOV     #-1,@PKSB       ;P-CLOCK, ALL 1'S
 9214  047644  012777  000135  131446        MOV     #135,@PKS       ;ENABLE INT, CT UP, REP INT
 9215  047652  000207                          RTS     PC              ;LINE FREQ & RUN
 9216
 9217                                  ;
 9218                                  ;KW11-L & KW11-P INTERRORUPT HANDLER
 9219                                  ;
 9220  047654  005037  001376          CLOCK:  CLR     TIMUP
 9221  047660  005337  001372                  DEC     COUNT
 9222  047664  001010                          BNE     1$
 9223  047666  013737  001370  001372        MOV     HZ,COUNT
 9224  047674  005337  001374                  DEC     SEC
 9225  047700  001002                          BNE     1$
 9226  047702  005237  001376                  INC     TIMUP           ;SORRY, TIME IS UP
 9227  047706  000002                  1$:     RTI
 9228                                  ;
 9229                                  ;ROUTINE TO TURN L OR P CLOCK INTERRORUPT OFF
 9230                                  ;
 9231  047710  005737  003500          CLKOF:  TST     PCLKF
 9232  047714  001003                          BNE     1$              ;BRACH IF P-CLOCK PRESENT
 9233  047716  005077  131404                  CLR     @LKS            ;L-CLOCK, CLEAR INTERRORUPT
 9234  047722  000207                          RTS     PC
 9235  047724  005077  131370          1$:     CLR     @PKS            ;P-CLOCK, CLEAR INTERRORUPT
 9236  047730  000207                          RTS     PC
 9237
 9238                                  ;
 9239                                  ;THIS ROUTINE GENERATES PARITY FOR THE EXPECTED MSGS
 9240                                  ;ENTER WITH THE EXPECTED WORD IN TEMP1
 9241                                  ;  TEMP1 IS ROTATED LEFT 17 TIMES. EACH TIME THE CARRY BIT IS SET,
 9242                                  ;R1 IS INCREMENTED. AT THE END OF 17 ROTATES ( TEMP1 BACK TO ORIG),
 9243                                  ;R1 BIT 0 IS EXAMINED. IF IT IS SET, INDICATING AN ODD # OF 1'S,
 9244                                  ;  THE PARITY BIT IS NOT SET IN B .
 9245                                  ;IF IT IS NOT SET, INDICATING AN EVEN # OF 1'S .THE PARITY BIT IS
                                       ;SET IN TEMP1
```

```
                        ;
                SBPAR:  MOV     R0,-(SP)        ;SAVE R0
                        MOV     R1,-(SP)        ;SAVE R1
                        MOV     #17..R0         ;SHIFT COUNTER
                        CLR     R1              ;COUNT # OF 1'S IN TEMP1
                        CLC                     ;CLEAR CARRY
                        
                1$:     ROL     TEMP1
                        BCC     2$              ;BR IF CARRY CLEAR
                        INC     R1              ;COUNT # OF 1'S
                2$:     DEC     R0              ;SHIFT COUNTER
                        BNE     1$
                        
                        BIT     #BIT0,R1
                        BNE     3$              ;BR IF ODD # IN R0
                        BIS     #M.PAR,TEMP1    ;SET PARITY BIT
                3$:     MOV     (SP)+,R1        ;RESTORE R1
                        MOV     (SP)+,R0        ;RESTORE R0
                        RTS     PC
                        
                        ;
                        ;ROUTINE TO ENABLE LOOPING ON INTERMITTANT ERRORS
                        ;WHEN $LPERR SET BY OTHER THAN SCOPE ROUTINE
                        ; IE: MY LOOP MACRO
                        ;
 050004 032777  001000  131126  $SCOP1$: BIT     #SW9,@SWR       ;LOOP ON ERROR?
 050012 001406                          BEQ     1$              ;BR IF NO
 050014 105737  001103'                 TSTB    $ERFLG          ;HAD ERROR?
 050020 001403                          BEQ     1$              ;BR IF NO
 050022 013716  001110                  MOV     $LPERR,(SP)
 050026 000002                          RTI
                
 050030 011637  001110          1$:     MOV     (SP),$LPERR     ;SET LOOP ADDR FOR TIGHT SCOPE LOOP
 050034 000002                          RTI
                
                        ;
                        ;CHECK FOR SW14 (LOOP ON TEST) OR SW8 (LOOP ON SPECIFIC TEST)
                        ;
                        ;RETURN IF NEITHER SET
                        ;RETURN +2 IF EITHER SET
                        ;
                        ;THIS SUBROUTINE IS USED AT THE END OF ANY TEST THAT REQUIRES
                        ;RECONDITIONING OF THE DRIVE BEFORE LOOPING ON AN ERROR OR TEST
                        ;
 050036 005037  001176  $SWTST: CLR     $ESCAPE
 050042 005037  001410          CLR     LPFLG
 050046 032777  040000  131064          BIT     #SW14,@SWR      ;LOOP ON TEST?
 050054 001403                          BEQ     3$              ;BR IF NO
 050056 062716  000002          1$:     ADD     #2,(SP)
 050062 000207                  2$:     RTS     PC
                
 050064 032777  000400  131046  3$:     BIT     #SW8,@SWR       ;LOOP ON SPECIFIC TEST?
 050072 001773                          BEQ     2$              ;BR IF NO
 050074 127737  131040  001102          CMPB    @SWR,$TSTNM     ;RIGHT TEST? SWR <7:0>
 050102 001765                          BEQ     1$              ;BR IF YES
 050104 000207                          RTS     PC
```

```
                                        ;
                                        ;THIS ROUTINE IS ENTERED BY TYPING A CONTROL-C.
                                        ;IT IS USED TO ALLOW THE OPERATOR TO HALT THE CPU WHILE INSURING
                                        ;THAT HEADS ARE LOADED & FORMATTING IS VALID BEFORE ACTUALLY HALTING
                                        ;THE CPU.
                                        ;
050106  022626          STOP:   CMP     (SP)+,(SP)+     ;RESTORE STACK FROM INTERRORUPT

050110  004737  046106          JSR     PC,SUBCLR
050114  104024                  ERROR   24              ;CERR AFTER

050116  005737  003316          TST     UNLD            ;SEE IF HEADS UNLOADED
050122  001432                  BEQ     3$              ;BR IF NO
050124  005737  000042          TST     42              ;SEE IF MANUAL OR AUTO MODE
050130  001403                  BEQ     1$              ;BR IF MANUAL MODE
050132  104401  057151          TYPE    ,MSG74          ;PGM ABORT PENDING
050136  000402                  BR      2$
050140  104401  057200  1$:     TYPE    ,MSG75          ;HALT PENDING
050144                  2$:

050144  004737  046106          JSR     PC,SUBCLR
050150  104024                  ERROR   24              ;CERR AFTER SCLR

050152  012765  000011  000000  MOV     #SPSPL,RKCS1(R5)        ;START SPINDLE CMD
050160  013737  001414  003372  MOV     T10,TEMP1       ;SET TIMEOUT
050166  004737  044176          JSR     PC,FRDY         ;FIND RDY
050172  104121                  ERROR   121             ;RDY NOT FOUND AFTER ST SPIN CMD.

050174  013737  001416  003374  MOV     T100,TEMP2      ;SETUP  TIMEOUT
050202  004737  044512          JSR     PC,FATTI        ;FIND ATTN
050206  104067                  ERROR   67              ;NO ATTN AFTER ST SPIN CMD.

050210  005737  003320  3$:     TST     BADHDR          ;SEE IF HEADERS VALID
050214  001466                  BEQ     4$              ;BF IF YES
050216  005237  003322          INC     HPEND

050222  012765  100000  000000  MOV     #CCLR,RKCS1(R5)
050230  013765  001222  000010  MOV     $UNIT,RKCS2(R5)
050236  012765  000013  000000  MOV     #RECAL,RKCS1(R5)        ;RECAL CMD
                                        ;RESET CYL DIFF/OFFSET & CYL ADDR REG
                                        ;IN RKMR2 & RKMR3 RESP.
050244  013737  001414  003372  MOV     T10,TEMP1
050252  004737  044176          JSR     PC,FRDY         ;FIND RDY
050256  104124                  ERROR   124             ;RDY NOT SET AFTER RECAL CMD

050260  012765  000001  000026  MOV     #1,RKMR1(R5)    ;SELECT WORD 1
050266  004737  045E34          JSR     PC,GSTAT
050272  032737  020000  003362  BIT     #D.RTZ,HMR2
050300  001001                  BNE     64$
050302  104244                  ERROR   244             ;RTZ NOT SET DURING RECAL CMD
050304  013737  001412  003374  64$:    MOV     T1,TEMP2        ;SETUP TIMEOUT
050312  004737  044512          JSR     PC,FATTI        ;FIND ATTN
050316  104055                  ERROR   55              ;NO ATTN AFTER RECAL CMD

050320  012765  100000  000000  MOV     #CCLR,RKCS1(R5)
```

```
 9358  050326  013765  001222  000010          MOV     $UNIT,RKCS2(R5) ;DRIVE#
 9359  050334  012765  000005  001000          MOV     #CLEAR,RKCS1(R5)        ;DRIVE CLEAR CMD
 9360  050342  013737  001414  003372          MOV     T10,#EMP1
 9361  050350  004737  044176                  JSR     PC,FRDY         ;FIND RDY
 9362  050354  104151                          ERROR   151             ;NO RDY AFTER DRIVE CLEAR CMD
 9363  050356  004737  044460                  JSR     PC,TSTATN       ;TEST FOR ATTN
 9364  050362  000401                          BR      65$
 9365  050364  104154                          ERROR   154             ;ATTN NOT CLEARED AFTER DRIVE CLEAR CMD
 9366  050366                          65$:
 9367
 9368
 9369  050366  000137  031646                  JMP     FORM            ;WRITE VALID FORMATS
 9370
 9371  050372  005737  000042          4$:     TST     42              ;SEE IF MANUAL OR AUTO MODE
 9372  050376  001406                          BEQ     5$              ;BR IF MANUAL MODE
 9373  050400  104401  057222                  TYPE    ,MSG76          ;PGM ABORTED
 9374  050404  005037  043544                  CLR     $EOPCT          ;SET UP EOP TO EXIT TO MONITOR
 9375  050410  000137  043470                  JMP     $EOP
 9376
 9377  050414  104401  057240          5$:     TYPE    ,MSG77          ;CPU HALTED
 9378  050420  000000                          HALT
 9379  050422  000137  007740                  JMP     ST5             ;START OVER IF CONTINUE PRESSED
 9380
 9381                                  .SBTTL  UNEXPECTED TIMEOUT HANDLER
 9382
 9383                                  ;
 9384                                  ;THIS ROUTINE IS ENTERED IF THERE IS
 9385                                  ;       A.  NON EXISTANT MEMORY (NO SSYN)
 9386                                  ;       B.  BOUNDRY ERROR
 9387                                  ;       C.  STACK OVERFLOW
 9388                                  ;
 9389
 9390  050426  011600                  BADTMO: MOV     (SP),R0         ;SAVE PC WHERE TIMEOUT OCCURRED.
 9391  050430  005740                          TST     -(R0)           ;GET PC BEFORE UPDATE
 9392  050432  032777  020000  130500          BIT     #SW13,@SWR      ;INHIBIT ERROR TYPOUT?
 9393  050440  001005                          BNE     1$              ;YES, DON'T TYPE
 9394  050442  104401  057416                  TYPE    ,EM3            ;ABORT TESTS,UNEXP T.O. @ PC=
 9395  050446  010046                          MOV     R0,-(SP)        ;;SAVE R0 FOR TYPEOUT
 9396                                                                  ;;TYPE PC
 9397  050450  104403                          TYPOS                   ;;GO TYPE--OCTAL ASCII
 9398  050452     006                          .BYTE   6               ;;TYPE 6 DIGIT(S)
 9399  050453     000                          .BYTE   0               ;;SUPPRESS LEADING ZEROS
 9400  050454  032777  001000  130456  1$:     BIT     #SW9,@SWR       ;LOOP ON ERROR?
 9401  050462  001403                          BEQ     2$              ;NO, BRANCH
 9402  050464  022626                          CMP     (SP)+,(SP)+     ;YES, RESTORE STACK
 9403  050466  000177  130414                  JMP     @$LPADR         ;GO TO STARTING ADDR OF TEST
 9404                                                                  ;THAT GAVE BAD TIMEOUT
 9405  050472  032777  040000  130440  2$:     BIT     #SW14,@SWR      ;LOOP ON TEST?
 9406  050500  001401                          BEQ     3$              ;NO BRANCH
 9407  050502  000002                          RTI                     ;YES
 9408
 9409  050504  000000                  3$:     HALT                    ;UNEXPECTED TIME OUT OCCURRED
 9410                                                                  ;AS INDICATED. YOU CAN LOOP ON
 9411                                                                  ;ERROR, LOOP ON TEST OR INHIBIT
 9412                                                                  ;ERROR TYPEOUT BY SETTING THOSE
 9413                                                                  ;SWITCHES.
```

```
                                                        ;
050506  022626                        CMP     (SP)+,(SP)+     ;RESTORE STACK
050510  000137  043516                JMP     $EOP1           ;ABORT TESTS

                                .SBTTL  MEMORY CHECK ENABLE TRAP

050514  012737  050530  001176  MEMERR: MOV     #1$,$ESCAPE     ;LOAD ESCAPE
050522  011637  001334                MOV     (SP),TRAPPC     ;STORE PC
050526  104236                        ERROR   236             ;UNEXP MEM PARITY TRAP

050530  005037  001176          1$:    CLR     $ESCAPE
050534  032777  001000  130376        BIT     #SW9,@SWR       ;CHECK IF LOOP ON ERROR
050542  001001                        BNE     2$              ;YES, FORCE STACK AND TRY AGAIN
050544  000002                        RTI                     ;ELSE RETURN

050546  012706  001100          2$:    MOV     #STACK,SP       ;INIT STACK
050552  000177  130332                JMP     @$LPERR         ;LOOP ON ERROR

                                .SBTTL  RK06 INTERRUPT HANDLER

050556  011600                  INTER:  MOV     (SP),R0         ;SAVE PC WHERE INT OCCURRED.
050560  005740                        TST     -(R0)           ;GET PC BEFORE UPDATE.
050562  104401  056163                TYPE    ,MSG6           ;INT AT PC=
050566  010046                        MOV     R0,-(SP)        ;;SAVE R0 FOR TYPEOUT
                                                            ;;TYPE PC
050570  104403                        TYPOS                   ;;GO TYPE--OCTAL ASCII
050572     006                        .BYTE   6               ;;TYPE 6 DIGIT(S)
050573     000                        .BYTE   0               ;;SUPPRESS LEADING ZEROS
050574  000002                        RTI

                                .SBTTL  POWER DOWN AND UP ROUTINES

                                .       ;POWER DOWN ROUTINE

050576  012737  050610  000024  $PWRDN: MOV     #$PWRUP,PWRVEC  ;SET UP VECTOR
050604  000000                        HALT
050606  000776                        BR      .-2             ;HANG UP.

                                ;POWER UP ROUTINE

050610  005037  050662          $PWRUP: CLR     $PWRCT          ;WAIT LOOP FOR TTY
050614  005237  050662          1$:    INC     $PWRCT          ;WAIT FOR THE INCR
050620  001375                        BNE     1$              ;OF WORD
050622  012737  050576  000024        MOV     #$PWRDN,PWRVEC  ;SET POWER DOWN VECTOR
050630  012737  000340  000026        MOV     #PR7,PWRVEC+2   ;PRIORITY 7
050636  012737  000340  000036        MOV     #PR7,TRAPVEC+2  ;LOCKOUT ALL INTERRORUPTS FOR TRAPS
050644  012706  001100                MOV     #STACK,SP       ;INITIALIZE STACK
050650  104401  056347                TYPE    ,MSG11          ;REPORT POWER FAIL
050654  000005                        RESET
050656  000137  011646                JMP     PFSRT

050662  000000                  $PWRCT: 0                       ;WAIT COUNT FOR TTY
```

```
                                .SBTTL  SCOPE HANDLER ROUTINE

                                ;;**********************************************************************
                                ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
                                ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
                                ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
                                ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
                                ;*SW14=1         LOOP ON TEST
                                ;*SW11=1         INHIBIT ITERATIONS
                                ;*SW09=1         LOOP ON ERROR
                                ;*SW08=1         LOOP ON TEST IN SWR<7:0>
                                ;*CALL
                                ;*      SCOPE           ;;SCOPE=IOT

050664                          $SCOPE:
050664  104407                         CKSWR                   ;;TEST  FOR CHANGE IN SOFT-SWR
050666  032777  040000  130244  1$:     BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
050674  001114                         BNE     $OVER           ;;YES IF SW14=1
                                ;*****START OF CODE FOR THE XOR TESTER*****
050676  000416                 $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
                                                                ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
050700  013746  000004                 MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
050704  012737  050724  000004         MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
050712  005737  177060                 TST     @#177060        ;;TIME OUT ON XOR?
050716  012637  000004                 MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
050722  000463                         BR      $SVLAD          ;;GO TO THE NEXT TEST
050724  022626                 5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
050726  012637  000004                 MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
050732  000423                         BR      7$              ;;LOOP ON THE PRESENT TEST
050734                         6$:;*****END OF CODE FOR THE XOR TESTER*****
050734  032777  000400  130176         BIT     #BIT08,@SWR     ;;LOOP ON SPEC. TEST?
050742  001404                         BEQ     2$              ;;BR IF NO
050744  127737  130170  001102         CMPB    @SWR,$TSTNM     ;;ON THE RIGHT TEST?    SWR<7:0>
050752  001465                         BEQ     $OVER           ;;BR IF YES
050754  105737  001103         2$:     TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
050760  001421                         BEQ     3$              ;;BR IF NO
050762  123737  001115  001103         CMPB    $ERMAX,$ERFLG   ;;MAX. ERRORS FOR THIS TEST OCCURRED?
050770  101015                         BHI     3$              ;;BR IF NO
050772  032777  001000  130140         BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
051000  001404                         BEQ     4$              ;;BR IF NO
051002  013737  001110  001106  7$:     MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
051010  000446                         BR      $OVER
051012  105037  001103         4$:     CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
051016  005037  001174                 CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
051022  000415                         BR      1$              ;;ESCAPE TO THE NEXT TEST
051024  032777  004000  130106  3$:     BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
051032  001011                         BNE     1$              ;;BR IF YES
051034  005737  001216                 TST     $PASS           ;;IF FIRST PASS OF PROGRAM
051040  001406                         BEQ     1$              ;;      INHIBIT ITERATIONS
051042  005237  001104                 INC     $ICNT           ;;INCREMENT ITERATION COUNT
051046  023737  001174  001104         CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
051054  002024                         BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
051056  012737  000001  001104  1$:     MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
051064  013737  051142  001174         MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
051072  105237  001102         $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
051076  113737  001102  001214         MOVB    $TSTNM,$TESTN   ;;SET TEST NUMBER IN APT MAILBOX
```

```
 9523  051104  011637  001106                MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
 9524  051110  011637  001110                MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
 9525  051114  005037  001176                CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
 9526  051120  112737  000001  001115        MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
 9527  051126  013777  001102  130006 $OVER: MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
 9528  051134  013716  001106                MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
 9529  051140  000002                        RTI                     ;;FIXES PS
 9530  051142  003720                $MXCNT: 2000.                   ;;MAX. NUMBER OF ITERATIONS
 9531                                .SBTTL  ERROR HANDLER ROUTINE
 9532
 9533                                ;;**************************************************************
 9534                                ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
 9535                                ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
 9536                                ;*AND GO TO TYPERR ON ERROR
 9537                                ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
 9538                                ;*SW15=1        HALT ON ERROR
 9539                                ;*SW13=1        INHIBIT ERROR TYPEOUTS
 9540                                ;*SW10=1        BELL ON ERROR
 9541                                ;*SW09=1        LOOP ON ERROR
 9542                                ;*CALL
 9543                                ;*      ERROR   N       ;;ERROR=EMT AND N=ERROR ITEM NUMBER
 9544
 9545  051144                        $ERROR:
 9546  051144  104407                        CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
 9547  051146  105237  001103        7$:     INCB    $ERFLG          ;;SET THE ERROR FLAG
 9548  051152  001775                        BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
 9549  051154  013777  001102  127760        MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
 9550  051162  032777  002000  127750        BIT     #BIT10,@SWR     ;;BELL ON ERROR?
 9551  051170  001402                        BEQ     1$              ;;NO - SKIP
 9552  051172  104401  001200                TYPE    ,$BELL          ;;RING BELL
 9553  051176  005237  001112        1$:     INC     $ERTTL          ;;COUNT THE NUMBER OF ERRORS
 9554  051202  011637  001116                MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
 9555  051206  162737  000002  001116        SUB     #2,$ERRPC
 9556  051214  117737  127676  001114        MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
 9557  051222  032777  020000  127710        BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
 9558  051230  001004                        BNE     20$             ;;SKIP TYPEOUTS
 9559  051232  004737  067610                JSR     PC,TYPERR       ;;GO TO USER ERROR ROUTINE
 9560  051236  104401  001205                TYPE    ,$CRLF
 9561  051242                        20$:
 9562  051242  122737  000001  001230        CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
 9563  051250  001007                        BNE     2$              ;;NO,SKIP APT ERROR REPORT
 9564  051252  113737  001114  051264        MOVB    $ITEMB,21$      ;;SET ITEM NUMBER AS ERROR NUMBER
 9565  051260  004737  052070                JSR     PC,$ATY4        ;;REPORT FATAL ERROR TO APT
 9566  051264     000                21$:    .BYTE   0
 9567  051265     000                        .BYTE   0
 9568  051266  000777                22$:    BR      22$             ;;APT ERROR LOOP
 9569  051270  005777  127644        2$:     TST     @SWR            ;;HALT ON ERROR
 9570  051274  100002                        BPL     3$              ;;SKIP IF CONTINUE
 9571  051276  000000                        HALT                    ;;HALT ON ERROR!
 9572  051300  104407                        CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
 9573  051302  032777  001000  127630  3$:   BIT     #BIT09,@SWR     ;;LOOP ON ERROR SWITCH SET?
 9574  051310  001402                        BEQ     4$              ;;BR IF NO
 9575  051312  013716  001110                MOV     $LPERR,(SP)     ;;FUDGE RETURN FOR LOOPING
 9576  051316  005737  001176        4$:     TST     $ESCAPE         ;;CHECK FOR AN ESCAPE ADDRESS
 9577  051322  001402                        BEQ     5$              ;;BR IF NONE
 9578  051324  013716  001176                MOV     $ESCAPE,(SP)    ;;FUDGE RETURN ADDRESS FOR ESCAPE
```

```
 9579  051330                        5$:
 9580  051330  022737  043604  000042        CMP     #$ENDAD,#42     ;;ACT-11 AUTO-ACCEPT?
 9581  051336  001301                        BNE     6$              ;;BRANCH IF NO
 9582  051340  000000                        HALT                    ;;YES
 9583  051342                        6$:
 9584  051342  000002                        RTI                     ;;RETURN
 9585                                .SBTTL  TYPE ROUTINE
 9586
 9587                                ;;**************************************************************
 9588                                ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
 9589                                ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
 9590                                ;*NOTE1:        $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
 9591                                ;*NOTE2:        $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
 9592                                ;*NOTE3:        $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
 9593                                ;*
 9594                                ;*CALL:
 9595                                ;*1) USING A TRAP INSTRUCTION
 9596                                ;*      TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
 9597                                ;*OR
 9598                                ;*      TYPE
 9599                                ;*      MESADR
 9600                                ;*
 9601
 9602  051344  105737  001157        $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
 9603  051350  100002                        BPL     1$              ;;BR IF YES
 9604  051352  000000                        HALT                    ;;HALT HERE IF NO TERMINAL
 9605  051354  000430                        BR      3$              ;;LEAVE
 9606  051356  010046                1$:     MOV     R0,-(SP)        ;;SAVE R0
 9607  051360  017600  000002                MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
 9608  051364  122737  000001  001230        CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
 9609  051372  001011                        BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
 9610  051374  132737  000100  001231        BITB    #APTSPOCL,$ENVM ;;SPOOL MESSAGE TO APT
 9611  051402  001405                        BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
 9612  051404  010037  051414                MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
 9613  051410  004737  052060                JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
 9614  051414  000000                61$:    .WORD   0               ;;MESSAGE ADDRESS
 9615  051416  132737  000040  001231  62$:  BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
 9616  051424  001003                        BNE     60$             ;;YES,SKIP TYPE OUT
 9617  051426  112046                2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
 9618  051430  001005                        BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
 9619  051432  005726                        TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
 9620  051434  012600                60$:    MOV     (SP)+,R0        ;;RESTORE R0
 9621  051436  062716  000002        3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
 9622  051442  000002                        RTI                     ;;RETURN
 9623  051444  122716  000011        4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
 9624  051450  001430                        BEQ     8$
 9625  051452  122716  000200                CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
 9626  051456  001006                        BNE     5$
 9627  051460  005726                        TST     (SP)+           ;;POP  <CR><LF> EQUIV
 9628  051462  104401                        TYPE                    ;;TYPE A CR AND LF
 9629  051464  001205                        $CRLF
 9630  051466  105037  051622                CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
 9631  051472  000755                        BR      2$              ;;GET NEXT CHARACTER
 9632  051474  004737  051556        5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
 9633  051500  123726  001156        6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
 9634  051504  001350                        BNE     2$              ;;IF NO GO GET NEXT CHAR.
```

```
 9635  051506  013746  001154            MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
 9636                                                              ;;AND THE NULL CHAR.
 9637  051512  105366  000001     7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
 9638  051516  002770                     BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
 9639  051520  004737  051556            JSR     PC,$TYPEC       ;;GO TYPE A NULL
 9640  051524  105337  051622            DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
 9641  051530  000770                     BR      7$              ;;LOOP
 9642
 9643                                    ;HORIZONTAL TAB PROCESSOR
 9644
 9645  051532  112716  000040     8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
 9646  051536  004737  051556     9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
 9647  051542  132737  000007  051622     BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
 9648  051550  001372                     BNE     9$              ;;TAB STOP
 9649  051552  005726                     TST     (SP)+           ;;POP SPACE OFF STACK
 9650  051554  000724                     BR      2$              ;;GET NEXT CHARACTER
 9651  051556  105777  127366     $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
 9652  051562  100375                     BPL     $TYPEC
 9653  051564  116677  000002  127360     MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
 9654  051572  122766  000015  000002     CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
 9655  051600  001003                     BNE     1$              ;;BRANCH IF NO
 9656  051602  105037  051622            CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
 9657  051606  000406                     BR      $TYPEX          ;;EXIT
 9658  051610  122766  000012  000002     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
 9659  051616  001402                     BEQ     $TYPEX          ;;BRANCH IF YES
 9660  051620  105227                     INCB    (PC)+           ;;COUNT THE CHARACTER
 9661  051622  000000     $CHARCNT:.WORD  0                       ;;CHARACTER COUNT STORAGE
 9662  051624  000207     $TYPEX: RTS     PC
 9663
 9664                                    .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
 9665
 9666                                    ;;*****************************************************************
 9667                                    ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
 9668                                    ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
 9669                                    ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
 9670                                    ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
 9671                                    ;*REPLACED WITH SPACES.
 9672                                    ;*CALL:
 9673                                    ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
 9674                                    ;*      TYPDS                   ;;GO TO THE ROUTINE
 9675
 9676  051626                     $TYPDS:
 9677  051626  010046                     MOV     R0,-(SP)        ;;PUSH R0 ON STACK
 9678  051630  010146                     MOV     R1,-(SP)        ;;PUSH R1 ON STACK
 9679  051632  010246                     MOV     R2,-(SP)        ;;PUSH R2 ON STACK
 9680  051634  010346                     MOV     R3,-(SP)        ;;PUSH R3 ON STACK
 9681  051636  010546                     MOV     R5,-(SP)        ;;PUSH R5 ON STACK
 9682  051640  012746  020200            MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
 9683  051644  016605  000020            MOV     20(SP),R5       ;;GET THE INPUT NUMBER
 9684  051650  100004                     BPL     1$              ;;BR IF INPUT IS POS.
 9685  051652  005405                     NEG     R5              ;;MAKE THE BINARY NUMBER POS.
 9686  051654  112766  000055  000001     MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
 9687  051662  005000                1$:  CLR     R0              ;;ZERO THE CONSTANTS INDEX
 9688  051664  012703  052042            MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
 9689  051670  112723  000040            MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
 9690  051674  005002                2$:  CLR     R2              ;;CLEAR THE BCD NUMBER
```

```
 9691  051676  016001  052032              MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
 9692  051702  160105              3$:     SUB     R1,R5           ;;FORM THIS BCD DIGIT
 9693  051704  002402                      BLT     4$              ;;BR IF DONE
 9694  051706  005202                      INC     R2              ;;INCREASE THE BCD DIGIT BY 1
 9695  051710  000774                      BR      3$
 9696  051712  060105              4$:     ADD     R1,R5           ;;ADD BACK THE CONSTANT
 9697  051714  005702                      TST     R2              ;;CHECK IF BCD DIGIT=0
 9698  051716  001002                      BNE     5$              ;;FALL THROUGH IF 0
 9699  051720  105716                      TSTB    (SP)            ;;STILL DOING LEADING 0'S?
 9700  051722  100407                      BMI     7$              ;;BR IF YES
 9701  051724  106316              5$:     ASLB    (SP)            ;;MSD?
 9702  051726  103003                      BCC     6$              ;;BR IF NO
 9703  051730  116663  000001  177777      MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
 9704  051736  052702  000060      6$:     BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
 9705  051742  052702  000040      7$:     BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
 9706  051746  110223                      MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
 9707  051750  005720                      TST     (R0)+           ;;JUST INCREMENTING
 9708  051752  020027  000010              CMP     R0,#10          ;;CHECK THE TABLE INDEX
 9709  051756  002746                      BLT     2$              ;;GO DO THE NEXT DIGIT
 9710  051760  003002                      BGT     8$              ;;GO TO EXIT
 9711  051762  010502                      MOV     R5,R2           ;;GET THE LSD
 9712  051764  000764                      BR      6$              ;;GO CHANGE TO ASCII
 9713  051766  105726              8$:     TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
 9714  051770  100003                      BPL     9$              ;;BR IF NO
 9715  051772  116663  177777  177776      MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
 9716  052000  105013              9$:     CLRB    (R3)            ;;SET THE TERMINATOR
 9717  052002  012605                      MOV     (SP)+,R5        ;;POP STACK INTO R5
 9718  052004  012603                      MOV     (SP)+,R3        ;;POP STACK INTO R3
 9719  052006  012602                      MOV     (SP)+,R2        ;;POP STACK INTO R2
 9720  052010  012601                      MOV     (SP)+,R1        ;;POP STACK INTO R1
 9721  052012  012600                      MOV     (SP)+,R0        ;;POP STACK INTO R0
 9722  052014  104401  052042              TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
 9723  052020  016666  000002  000004      MOV     2(SP),4(SP)     ;;ADJUST THE STACK
 9724  052026  012616                      MOV     (SP)+,(SP)
 9725  052030  000002                      RTI                     ;;RETURN TO USER
 9726  052032  023420              $DTBL:  10000.
 9727  052034  001750                      1000.
 9728  052036  000144                      100.
 9729  052040  000012                      10.
 9730  052042  000004              $DBLK:  .BLKW   4
 9731                              .SBTTL  APT COMMUNICATIONS ROUTINE
 9732
 9733                              ;;**********************************************************************
 9734  052052  112737  000001  052316  $ATY1:  MOVB    #1,$FFLG        ;;TO REPORT FATAL ERROR
 9735  052060  112737  000001  052314  $ATY3:  MOVB    #1,$MFLG        ;;TO TYPE A MESSAGE
 9736  052066  000403                      BR      $ATYC
 9737  052070  112737  000001  052316  $ATY4:  MOVB    #1,$FFLG        ;;TO ONLY REPORT FATAL ERROR
 9738  052076                          $ATYC:
 9739  052076  010046                      MOV     R0,-(SP)        ;;PUSH R0 ON STACK
 9740  052100  010146                      MOV     R1,-(SP)        ;;PUSH R1 ON STACK
 9741  052102  105737  052314              TSTB    $MFLG           ;;SHOULD TYPE A MESSAGE?
 9742  052106  001450                      BEQ     5$              ;;IF NOT:  BR
 9743  052110  122737  000001  001230      CMPB    #APTENV,$ENV    ;;OPERATING UNDER APT?
 9744  052116  001031                      BNE     3$              ;;IF NOT:  BR
 9745  052120  132737  000100  001231      BITB    #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
 9746  052126  001425                      BEQ     3$              ;;IF NOT:  BR
```

```
 9747  052130  017600  000004              MOV     @4(SP),R0       ;;GET MESSAGE ADDR.
 9748  052134  062766  000002  000004      ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
 9749  052142  005737  001210          1$: TST     $MSGTYPE        ;;SEE IF DONE W/ LAST TRANSMISSION
 9750  052146  001375                      BNE     1$              ;;IF NOT:  WAIT
 9751  052150  010037  001224              MOV     R0,$MSGAD       ;;PUT ADDR IN MAILBOX
 9752  052154  105720                  2$: TSTB    (R0)+           ;;FIND END OF MESSAGE
 9753  052156  001376                      BNE     2$
 9754  052160  163700  001224              SUB     $MSGAD,R0       ;;SUB START OF MESSAGE
 9755  052164  006200                      ASR     R0              ;;GET MESSAGE LNGTH IN WORDS
 9756  052166  010037  001226              MOV     R0,$MSGLGT      ;;PUT LENGTH IN MAILBOX
 9757  052172  012737  000004  001210      MOV     #4,$MSGTYPE     ;;TELL APT TO TAKE MSG.
 9758  052200  000413                      BR      5$
 9759  052202  017637  000004  052226  3$: MOV     @4(SP),4$       ;;PUT MSG ADDR IN JSR LINKAGE
 9760  052210  062766  000002  000004      ADD     #2,4(SP)                ;;BUMP RETURN ADDRESS
 9761  052216  013746  177776              MOV     177776,-(SP)    ;;PUSH 177776 ON STACK
 9762  052222  004737  051344              JSR     PC,$TYPE        ;;CALL TYPE MACRO
 9763  052226  000000                  4$: .WORD   0
 9764  052230                          5$:
 9765  052230  105737  052316          10$: TSTB   $FFLG           ;;SHOULD REPORT FATAL ERROR?
 9766  052234  001416                      BEQ     12$             ;;IF NOT:  BR
 9767  052236  005737  001230              TST     $ENV            ;;RUNNING UNDER APT?
 9768  052242  001413                      BEQ     12$             ;;IF NOT:  BR
 9769  052244  005737  001210          11$: TST    $MSGTYPE        ;;FINISHED LAST MESSAGE?
 9770  052250  001375                      BNE     11$             ;;IF NOT:  WAIT
 9771  052252  017637  000004  001212      MOV     @4(SP),$FATAL   ;;GET ERROR #
 9772  052260  062766  000002  000004      ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
 9773  052266  005237  001210              INC     $MSGTYPE        ;;TELL APT TO TAKE ERROR
 9774  052272  105037  052316          12$: CLRB   $FFLG           ;;CLEAR FATAL FLAG
 9775  052276  105037  052315              CLRB    $LFLG           ;;CLEAR LOG FLAG
 9776  052302  105037  052314              CLRB    $MFLG           ;;CLEAR MESSAGE FLAG
 9777  052306  012601                      MOV     (SP)+,R1        ;;POP STACK INTO R1
 9778  052310  012600                      MOV     (SP)+,R0        ;;POP STACK INTO R0
 9779  052312  000207                      RTS     PC              ;;RETURN
 9780  052314     000              $MFLG: .BYTE   0               ;;MESSG. FLAG
 9781  052315     000              $LFLG: .BYTE   0               ;;LOG FLAG
 9782  052316     000              $FFLG: .BYTE   0               ;;FATAL FLAG
 9783          052320                      .EVEN
 9784          000200              APTSIZE=200
 9785          000001              APTENV=001
 9786          000100              APTSPOOL=100
 9787          000040              APTCSUP=040
 9788                              .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE
 9789
 9790                              ;;**************************************************************
 9791                              ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
 9792                              ;*OCTAL (ASCII) NUMBER AND TYPE IT.
 9793                              ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
 9794                              ;*CALL:
 9795                              ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
 9796                              ;*      TYPOS                   ;;CALL FOR TYPEOUT
 9797                              ;*      .BYTE   N               ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
 9798                              ;*      .BYTE   M               ;;M=1 OR 0
 9799                              ;*                                      ;;1=TYPE LEADING ZEROS
 9800                              ;*                                      ;;0=SUPPRESS LEADING ZEROS
 9801                              ;*
 9802                              ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
```

```
 9803                                   ;*$TYPOS OR $TYPOC
 9804                                   ;*CALL:
 9805                                   ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
 9806                                   ;*      TYPON                   ;;CALL FOR TYPEOUT
 9807                                   ;*
 9808                                   ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
 9809                                   ;*CALL:
 9810                                   ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
 9811                                   ;*      TYPOC                   ;;CALL FOR TYPEOUT
 9812
 9813  052320  017646  000000           $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
 9814  052324  116637  000001  052543           MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
 9815  052332  112637  052545                   MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
 9816  052336  062716  000002                   ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
 9817  052342  000406                           BR      $TYPON
 9818  052344  112737  000001  052543  $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
 9819  052352  112737  000006  052545          MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
 9820  052360  112737  000005  052542  $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
 9821  052366  010346                           MOV     R3,-(SP)        ;;SAVE R3
 9822  052370  010446                           MOV     R4,-(SP)        ;;SAVE R4
 9823  052372  010546                           MOV     R5,-(SP)        ;;SAVE R5
 9824  052374  113704  052545                   MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
 9825  052400  005404                           NEG     R4
 9826  052402  062704  000006                   ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
 9827  052406  110437  052544                   MOVB    R4,$OMODE       ;;SAVE IT FOR USE
 9828  052412  113704  052543                   MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
 9829  052416  016605  000012                   MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
 9830  052422  005003                           CLR     R3              ;;CLEAR THE OUTPUT WORD
 9831  052424  006105                   1$:     ROL     R5              ;;ROTATE MSB INTO "C"
 9832  052426  000404                           BR      3$              ;;GO DO MSB
 9833  052430  006105                   2$:     ROL     R5              ;;FORM THIS DIGIT
 9834  052432  006105                           ROL     R5
 9835  052434  006105                           ROL     R5
 9836  052436  010503                           MOV     R5,R3
 9837  052440  006103                   3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
 9838  052442  105337  052544                   DECB    $OMODE          ;;TYPE THIS DIGIT?
 9839  052446  100016                           BPL     7$              ;;BR IF NO
 9840  052450  042703  177770                   BIC     #177770,R3      ;;GET RID OF JUNK
 9841  052454  001002                           BNE     4$              ;;TEST FOR 0
 9842  052456  005704                           TST     R4              ;;SUPPRESS THIS 0?
 9843  052460  001403                           BEQ     5$              ;;BR IF YES
 9844  052462  005204                   4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
 9845  052464  052703  000060                   BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
 9846  052470  052703  000040           5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
 9847  052474  110337  052540                   MOVB    R3,8$           ;;SAVE FOR TYPING
 9848  052500  104401  052540                   TYPE    ,8$             ;;GO TYPE THIS DIGIT
 9849  052504  105337  052542           7$:     DECB    $OCNT           ;;COUNT BY 1
 9850  052510  003347                           BGT     2$              ;;BR IF MORE TO DO
 9851  052512  002402                           BLT     6$              ;;BR IF DONE
 9852  052514  005204                           INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
 9853  052516  000744                           BR      2$              ;;GO DO THE LAST DIGIT
 9854  052520  012605                   6$:     MOV     (SP)+,R5        ;;RESTORE R5
 9855  052522  012604                           MOV     (SP)+,R4        ;;RESTORE R4
 9856  052524  012603                           MOV     (SP)+,R3        ;;RESTORE R3
 9857  052526  016666  000002  000004           MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
 9858  052534  012616                           MOV     (SP)+,(SP)
```

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 9859  052536  000002                    RTI                         ;;RETURN
 9860  052540     000                 8$:    .BYTE   0               ;;STORAGE FOR ASCII DIGIT
 9861  052541     000                        .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
 9862  052542     000                 $OCNT: .BYTE   0               ;;OCTAL DIGIT COUNTER
 9863  052543     000                 $OFILL: .BYTE  0               ;;ZERO FILL SWITCH
 9864  052544  000000                 $OMODE: .WORD  0               ;;NUMBER OF DIGITS TO TYPE
 9865                                 .SBTTL  TTY INPUT ROUTINE
 9866
 9867                                 ;;*****************************************************************
 9868                                 .ENABL  LSB
 9869  052546  000000                 $TKCNT: .WORD  0               ;;NUMBER OF ITEMS IN QUEUE
 9870  052550  000000                 $TKQIN: .WORD  0               ;;INPUT POINTER
 9871  052552  000000                 $TKQOUT: .WORD 0               ;;OUTPUT POINTER
 9872  052554  000001                 $TKQSRT: .BLKB 1               ;;TTY KEYBOARD QUEUE
 9873          052555                 $TKQEND=.
 9874          052556                 .EVEN
 9875
 9876                                 ;*TK INITIALIZE ROUTINE
 9877                                 ;*THIS ROUTINE WILL INITIALIZE THE TTY KEYBOARD INPUT QUEUE
 9878                                 ;*SETUP THE INTERRUPT VECTOR AND TURN ON THE KEYBOARD INTERRUPT
 9879                                 ;
 9880                                 ;*CALL:
 9881                                 ;*     JSR     PC,$TKINT
 9882                                 ;*     RETURN
 9883                                 ;
 9884  052556  005037  052546        $TKINT: CLR     $TKCNT          ;;CLEAR COUNT OF ITEMS IN QUEUE
 9885  052562  012737  052554  052550      MOV     #$TKQSRT,$TKQIN ;;MOVE THE STARTING ADDRESS OF THE
 9886  052570  013737  052550  052552      MOV     $TKQIN,$TKQOUT  ;;QUEUE INTO THE INPUT & OUTPUT POINTERS.
 9887  052576  012737  052626  000060      MOV     #$TKSRV,@#TKVEC ;;INITIALIZE THE KEYBOARD VECTOR
 9888  052604  012737  000200  000062      MOV     #200,@#TKVEC+2  ;;"BR" LEVEL 4
 9889  052612  005777  126330              TST     @$TKB           ;;CLEAR DONE FLAG
 9890  052616  012777  000100  126320      MOV     #100,@$TKS      ;;ENABLE TTY KEYBOARD INTERRUPT
 9891  052624  000207                      RTS     PC              ;;RETURN TO CALLER
 9892
 9893                                 ;*TK SERVICE ROUTINE
 9894                                 ;*THIS ROUTINE WILL SERVICE THE TTY KEYBOARD INTERRUPT
 9895                                 ;*BY READING THE CHARACTER FROM THE INPUT BUFFER AND PUTTING
 9896                                 ;*IT IN THE QUEUE.
 9897                                 ;*IF THE CHARACTER IS A "CONTROL-C" (^C) $TKINT IS CALLED AND
 9898                                 ;*UPON RETURN EXIT IS MADE TO THE "CONTROL-C" RESTART ADDRESS (STOP)
 9899                                 ;
 9900  052626  117746  126314        $TKSRV: MOVB    @$TKB,-(SP)     ;;PICKUP THE CHARACTER
 9901  052632  042716  177600              BIC     #^C177,(SP)     ;;STRIP THE JUNK
 9902  052636  021627  000003              CMP     (SP),#3         ;;IS IT A CONTROL C?
 9903  052642  001007                      BNE     1$              ;;BRANCH IF NO
 9904  052644  104401  053754              TYPE    ,$CNTLC         ;;TYPE A CONTROL-C (^C)
 9905  052650  004737  052556              JSR     PC,$TKINT       ;;INIT THE KEYBOARD
 9906  052654  005726                      TST     (SP)+           ;;CLEAN UP STACK
 9907  052656  000137  050106              JMP     STOP            ;;CONTROL C RESTART
 9908  052662  021627  000007        1$:   CMP     (SP),#7         ;;IS IT A CONTROL G?
 9909  052666  001004                      BNE     2$              ;;BRANCH IF NO
 9910  052670  022737  000176  001140      CMP     #SWREG,SWR      ;;IS SOFT-SWR SELECTED?
 9911  052676  001500                      BEQ     6$              ;;GO TO SWR CHANGE
 9912
 9913  052700                       2$:
 9914  052700  022737  000001  052546      CMP     #1,$TKCNT       ;;IS THE QUEUE FULL?
```

```
 9915  052706  001004                    BNE     3$              ;;BRANCH IF NO
 9916  052710  104401  001200            TYPE    ,$BELL          ;;RING THE TTY BELL
 9917  052714  005726                    TST     (SP)+           ;;CLEAN CHARACTER OFF OF STACK
 9918  052716  000451                    BR      5$              ;;EXIT
 9919  052720  021627  000023    3$:     CMP     (SP),#23        ;;IS IT A CONTROL-S?
 9920  052724  001021                    BNE     22$             ;;BRANCH IF NO
 9921  052726  005077  126212            CLR     @$TKS           ;;DISABLE TTY KEYBOARD INTERRUPTS
 9922  052732  005726                    TST     (SP)+           ;;CLEAN CHAR OFF STACK
 9923  052734  105777  126204    31$:    TSTB    @$TKS           ;;WAIT FOR A CHAR
 9924  052740  100375                    BPL     31$             ;;LOOP UNTIL ITS THERE
 9925  052742  117746  126200            MOVB    @$TKB,-(SP)     ;;GET THE CHARACTER
 9926  052746  042716  177600            BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
 9927  052752  022627  000021            CMP     (SP)+,#21       ;;IS IT A CONTROL-Q?
 9928  052756  001366                    BNE     31$             ;;BRANCH IF NO
 9929  052760  012777  000100  126156    MOV     #100,@$TKS      ;;REENABLE TTY KEYBOARD INTERRUPTS
 9930  052766  000002                    RTI                     ;;RETURN
 9931  052770  005237  052546    32$:    INC     $TKCNT          ;;COUNT THIS CHARACTER
 9932  052774  021627  000140            CMP     (SP),#140       ;;IS IT UPPER CASE?
 9933  053000  002405                    BLT     4$              ;;BRANCH IF YES
 9934  053002  021627  000175            CMP     (SP),#175       ;;IS IT A SPECIAL CHAR?
 9935  053006  003002                    BGT     4$              ;;BRANCH IF YES
 9936  053010  042716  000040            BIC     #40,(SP)        ;;MAKE IT UPPER CASE
 9937  053014  112677  177530    4$:     MOVB    (SP)+,@$TKQIN   ;;AND PUT IT IN QUEUE
 9938  053020  005237  052550            INC     $TKQIN          ;;UPDATE THE POINTER
 9939  053024  023727  052550  052555    CMP     $TKQIN,#$TKQEND ;;GO OFF THE END?
 9940  053032  001003                    BNE     5$              ;;BRANCH IF NO
 9941  053034  012737  052554  052550    MOV     #$TKQSRT,$TKQIN ;;RESET THE POINTER
 9942  053042  000002            5$:     RTI                     ;;RETURN
 9943
 9944                                    ;;**************************************************
 9945                                    ;*SOFTWARE SWITCH REGISTER CHANGE ROUTINE.
 9946                                    ;*ROUTINE IS ENTERED  FROM THE TRAP HANDLER, AND WILL
 9947                                    ;*SERVICE THE TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER TRAP
 9948                                    ;*CALL WHEN OPERATING IN TTY INTERRUPT MODE.
 9949  053044  022737  000176  001140  $CKSWR: CMP     #SWREG,SWR      ;;IS THE SOFT-SWR SELECTED
 9950  053052  001124                    BNE     15$             ;;EXIT IF NOT
 9951  053054  105777  126064            TSTB    @$TKS           ;;IS A CHAR WAITING?
 9952  053060  100121                    BPL     15$             ;;IF NOT, EXIT
 9953  053062  117746  126060            MOVB    @$TKB,-(SP)     ;;YES
 9954  053066  042716  177600            BIC     #^C177,(SP)     ;;MAKE IT  7-BIT ASCII
 9955  053072  021627  000007            CMP     (SP),#7         ;;IS IT A CONTROL-G?
 9956  053076  001300                    BNE     2$              ;;IF NOT, PUT IT IN THE TTY QUEUE
 9957                                                            ;;AND EXIT
 9958
 9959                                    ;;**************************************************************
 9960                                    ;*CONTROL IS PASSED TO THIS POINT FROM EITHER THE TTY INTERRUPT SERVICE
 9961                                    ;*ROUTINE OR FROM THE SOFTWARE SWITCH REGISTER TRAP CALL, AS A RESULT OF A
 9962                                    ;*CONTROL-G BEING TYPED, AND THE SOFTWARE SWITCH REGISTER BEING SELECTED.
 9963  053100  123727  001134  000001  6$:     CMPB    $AUTOB,#1       ;;ARE WE RUNNING IN AUTO-MODE?
 9964  053106  001674                    BEQ     2$              ;;BRANCH IF YES
 9965  053110  005726                    TST     (SP)+           ;;CLEAR CONTROL-G OFF STACK
 9966  053112  004737  052556            JSR     PC,$TKINT       ;;FLUSH THE TTY INPUT QUEUE
 9967  053116  005077  126022            CLR     @$TKS           ;;DISABLE TTY KEYBOARD INTERRUPTS
 9968  053122  112737  000001  001135    MOVB    #1,$INTAG       ;;SET INTERRUPT MODE INDICATOR
 9969
 9970  053130  104401  053766            TYPE    ,$CNT_G         ;;ECHO THE CONTROL-G (^G)
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 9971  053134  104401  053773          $GTSWR: TYPE    ,$MSWR          ;;TYPE CURRENT CONTENTS
 9972  053140  013746  000176                  MOV     @#SWREG,-(SP)   ;;SAVE SWREG FOR TYPEOCT
 9973  053144  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 9974  053146  104401  054004                  TYPE    ,$MNEW          ;;PROMPT FOR NEW SWR
 9975  053152  005046                  19$:    CLR     -(SP)           ;;CLEAR COUNTER
 9976  053154  005046                          CLR     -(SP)           ;;THE NEW SWR
 9977  053156  105777  125762          7$:     TSTB    @#TKS           ;;CHAR THERE?
 9978  053162  100375                          BPL     7$              ;;IF NOT TRY AGAIN
 9979
 9980  053164  117746  125756                  MOVB    @#TKB,-(SP)     ;;PICK UP CHAR
 9981  053170  042716  177600                  BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
 9982
 9983  053174  021627  000003                  CMP     (SP),#3         ;;IS IT A CONTROL-C?
 9984  053200  001015                          BNE     9$              ;;BRANCH IF NOT
 9985  053202  104401  053754                  TYPE    ,$CNTLC         ;;YES, ECHO CONTROL-C (^C)
 9986  053206  062706  000006                  ADD     #6,SP           ;;CLEAN UP STACK
 9987  053212  123727  001136  000001          CMPB    $INTAG,#1       ;;REENABLE TTY KEYBOARD INTERRUPTS?
 9988  053220  001003                          BNE     8$              ;;BRANCH IF NO
 9989  053222  012777  000100  125714          MOV     #100,@#TKS      ;;ALLOW TTY KEYBOARD INTERRUPTS
 9990  053230  000137  050106          8$:     JMP     STOP            ;;CONTROL-C RESTART
 9991
 9992
 9993  053234  021627  000025          9$:     CMP     (SP),#25        ;;IS IT A CONTROL-U?
 9994  053240  001005                          BNE     10$             ;;BRANCH IF NOT
 9995  053242  104401  053761                  TYPE    ,$CNTLU         ;;YES, ECHO CONTROL-U (^U)
 9996  053246  062706  000006          20$:    ADD     #6,SP           ;;IGNORE PREVIOUS INPUT
 9997  053252  000737                          BR      19$             ;;LET'S TRY IT AGAIN
 9998
 9999
10000  053254  021627  000015          10$:    CMP     (SP),#15        ;;IS IT A <CR>?
10001  053260  001022                          BNE     16$             ;;BRANCH IF NO
10002  053262  005766  000004                  TST     4(SP)           ;;YES, IS IT THE FIRST CHAR?
10003  053266  001403                          BEQ     11$             ;;BRANCH IF YES
10004  053270  016677  000002  125642          MOV     2(SP),@#SWR     ;;SAVE NEW SWR
10005  053276  062706  000006          11$:    ADD     #6,SP           ;;CLEAR UP STACK
10006  053302  104401  001205          14$:    TYPE    ,$CRLF          ;;ECHO <CR> AND <LF>
10007  053306  123727  001136  000001          CMPB    $INTAG,#1       ;;RE-ENABLE TTY KBD INTERRUPTS?
10008  053314  001003                          BNE     15$             ;;BRANCH IF NOT
10009  053316  012777  000100  125620          MOV     #100,@#TKS      ;;RE-ENABLE TTY KBD INTERRUPTS
10010  053324  000002          15$:    RTI                             ;;RETURN
10011  053326  004737  051556          16$:    JSR     PC,$TYPEC       ;;ECHO CHAR
10012  053332  021627  000060                  CMP     (SP),#60        ;;CHAR < 0?
10013  053336  002420                          BLT     18$             ;;BRANCH IF YES
10014  053340  021627  000067                  CMP     (SP),#67        ;;CHAR > 7?
10015  053344  003015                          BGT     18$             ;;BRANCH IF YES
10016  053346  042726  000060                  BIC     #60,(SP)+       ;;STRIP-OFF ASCII
10017  053352  005766  000002                  TST     2(SP)           ;;IS THIS THE FIRST CHAR
10018  053356  001403                          BEQ     17$             ;;BRANCH IF YES
10019  053360  006316                          ASL     (SP)            ;;NO, SHIFT PRESENT
10020  053362  006316                          ASL     (SP)            ;;    CHAR OVER TO MAKE
10021  053364  006316                          ASL     (SP)            ;;    ROOM FOR NEW ONE.
10022  053366  005266  000002          17$:    INC     2(SP)           ;;KEEP COUNT OF CHAR
10023  053372  056616  177776                  BIS     -2(SP),(SP)     ;;SET IN NEW CHAR
10024  053376  000667                          BR      7$              ;;GET THE NEXT ONE
10025  053400  104401  001204          18$:    TYPE    ,$QUES          ;;TYPE ?<CR><LF>
10026  053404  000720                          BR      20$             ;;SIMULATE CONTROL-U
```

```
                                .DSABL  LSB


                                ;;*****************************************************************
                                ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
                                ;*CALL:
                                ;*      RDCHR                   ;;GET A CHARACTER FROM THE QUEUE
                                ;*      RETURN HERE             ;;CHARACTER IS ON THE STACK
                                ;*                              ;;WITH PARITY BIT STRIPPED OFF
                                ;

                                $RDCHR: MOV     (SP),-(SP)      ;;PUSH DOWN THE PC AND
                                        MOV     4(SP),2(SP)     ;;THE PS
                                        CLR     4(SP)           ;;GET READY FOR A CHARACTER
                                        CLR     -(SP)           ;;PUT NEW PS ON STACK
                                        MOV     #64$,-(SP)      ;;PUT NEW PC ON  STACK
                                        RTI                     ;;POP NEW PC AND PS
                                64$:
                                1$:     TST     $TKCNT          ;;WAIT ON A CHARACTER
                                        BEQ     1$
                                        DEC     $TKCNT          ;;DECREMENT THE COUNTER
                                        MOVB    @$TKQOUT,4(SP)  ;;GET ONE CHARACTER
                                        INC     $TKQOUT         ;;UPDATE THE POINTER
                                        CMP     $TKQOUT,#$TKQEND ;;DID IT GO OFF OF THE END?
                                        BNE     2$              ;;BRANCH IF NO
                                        MOV     #$TKQSRT,$TKQOUT ;;RESET THE POINTER
                                2$:     RTI                     ;;RETURN
                                ;;*****************************************************************
                                ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
                                ;*CALL:
                                ;*      RDLIN                   ;;INPUT A STRING FROM THE TTY
                                ;*      RETURN HERE             ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
                                ;*                              ;;TERMINATOR WILL BE A BYTE OF ALL 0'S

                                $RDLIN: MOV     R3,-(SP)        ;;SAVE R3
                                        CLR     -(SP)           ;;CLEAR THE RUBOUT KEY
                                1$:     MOV     #$TTYIN,R3      ;;GET ADDRESS
                                2$:     CMP     #$TTYIN+22,R3   ;;BUFFER FULL?
                                        BLOS    4$              ;;BR IF YES
                                        RDCHR                   ;;GO READ ONE CHARACTER FROM THE TTY
                                        MOVB    (SP)+,(R3)      ;;GET CHARACTER
                                10$:    CMPB    #177,(R3)       ;;IS IT A RUBOUT
                                        BNE     5$              ;;BR IF NO
                                        TST     (SP)            ;;IS THIS THE FIRST RUBOUT?
                                        BNE     6$              ;;BR IF NO
                                        MOVB    #'\,9$          ;;TYPE A BACK SLASH
                                        TYPE    ,9$
                                        MOV     #-1,(SP)        ;;SET THE RUBOUT KEY
                                6$:     DEC     R3              ;;BACKUP BY ONE
                                        CMP     R3,#$TTYIN      ;;STACK EMPTY?
                                        BLO     4$              ;;BR IF YES
                                        MOVB    (R3),9$         ;;SETUP TO TYPEOUT THE DELETED CHAR.
                                        TYPE    ,9$             ;;GO TYPE
                                        BR      2$              ;;GO READ ANOTHER CHAR.
                                5$:     TST     (SP)            ;;RUBOUT KEY SET?
                                        BEQ     7$              ;;BR IF NO
```

```
 10083  053576  112737  000134  053730          MOVB    #'\,$$          ;;TYPE A BACK SLASH
 10084  053604  104401  053730                  TYPE    ,$$
 10085  053610  005016                          CLR     (SP)            ;;CLEAR THE RUBOUT KEY
 10086  053612  122713  000025          7$:     CMPB    #25,(R3)        ;;IS CHARACTER A CTRL U"
 10087  053616  001003                          BNE     8$              ;;BR IF NO
 10088  053620  104401  053761                  TYPE    ,$CNTLU         ;;TYPE A CONTROL "U"
 10089  053624  000726                          BR      1$              ;;GO START OVER
 10090  053626  122713  000022          8$:     CMPB    #22,(R3)        ;;IS CHARACTER A "^R"?
 10091  053632  001011                          BNE     3$              ;;BRANCH IF NO
 10092  053634  105013                          CLRB    (R3)            ;;CLEAR THE CHARACTER
 10093  053636  104401  001205                  TYPE    ,$CRLF          ;;TYPE A "CR" & "LF"
 10094  053642  104401  053732                  TYPE    ,$TTYIN         ;;TYPE THE INPUT STRING
 10095  053646  000717                          BR      2$              ;;GO PICKUP ANOTHER CHACTER
 10096  053650  104401  001204          4$:     TYPE    ,$QUES          ;;TYPE A '?'
 10097  053654  000712                          BR      1$              ;;CLEAR THE BUFFER AND LOOP
 10098  053656  111337  053730          3$:     MOVB    (R3),9$         ;;ECHO THE CHARACTER
 10099  053662  104401  053730                  TYPE    ,9$
 10100  053666  122723  000015                  CMPB    #15,(R3)+       ;;CHECK FOR RETURN
 10101  053672  001305                          BNE     2$              ;;LOOP IF NOT RETURN
 10102  053674  105063  177777                  CLRB    -1(R3)          ;;CLEAR RETURN (THE 15)
 10103  053700  104401  001206                  TYPE    ,$LF            ;;TYPE A LINE FEED
 10104  053704  005726                          TST     (SP)+           ;;CLEAN RUBOUT KEY FROM THE STACK
 10105  053706  012603                          MOV     (SP)+,R3        ;;RESTORE R3
 10106  053710  011646                          MOV     (SP),-(SP)      ;;ADJUST THE STACK AND PUT ADDRESS OF THE
 10107  053712  016666  000004  000002          MOV     4(SP),2(SP)     ;;      FIRST ASCII CHARACTER ON IT
 10108  053720  012766  053732  000004          MOV     #$TTYIN,4(SP)
 10109  053726  000002                          RTI                     ;;RETURN
 10110  053730     000                  9$:     .BYTE   0               ;;STORAGE FOR ASCII CHAR. TO TYPE
 10111  053731     000                          .BYTE   0               ;;TERMINATOR
 10112  053732  000022               $TTYIN: .BLKB   22              ;;RESERVE 22 BYTES FOR TTY INPUT
 10113  053754  041536  005015     000  $CNTLC: .ASCIZ  /^C/<15><12>    ;;CONTROL "C"
 10114  053761     136  006525  000012  $CNTLU: .ASCIZ  /^U/<15><12>    ;;CONTROL "U"
 10115  053766  043536  005015     000  $CNTLG: .ASCIZ  /^G/<15><12>    ;;CONTROL "G"
 10116  053773     015  051412  051127  $MSWR:  .ASCIZ  <15><12>/SWR = /
 10117  054000  036440  000040
 10118  054004  020040  042516  020127  $MNEW:  .ASCIZ  /  NEW = /
 10119  054012  020075     000
 10120          054016                  .EVEN
 10121                                  .SBTTL  READ AN OCTAL NUMBER FROM THE TTY
 10122
 10123                                  ;;*****************************************************************
 10124                                  ;*THIS ROUTINE WILL READ AN OCTAL (ASCII) NUMBER FROM THE TTY AND
 10125                                  ;*CHANGE IT TO BINARY.
 10126                                  ;*THE INPUT CHARACTERS WILL BE CHECKED TO INSURED THEY ARE LEGAL
 10127                                  ;*OCTAL DIGITS. IF AN ILLEGAL CHARACTER IS READ A "?" WILL BE TYPED
 10128                                  ;*FOLLOWED BY A CARRIAGE RETURN-LINE FEED. THE COMPLETE NUMBER MUST
 10129                                  ;*THEN BE RETYPED. THE INPUT IS TERMINATED BY TYPING A CARRIAGE RETURN.
 10130                                  ;*CALL:
 10131                                  ;*      RDOCT                   ;;READ AN OCTAL NUMBER
 10132                                  ;*      RETURN HERE             ;;LOW ORDER BITS ARE ON TOP OF THE STACK
 10133                                  ;*                              ;;HIGH ORDER BITS ARE IN $HIOCT
 10134
 10135  054016  011646               $RDOCT: MOV     (SP),-(SP)      ;;PROVIDE SPACE FOR THE
 10136  054020  016666  000004  000002          MOV     4(SP),2(SP)     ;;INPUT NUMBER
 10137  054026  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
 10138  054030  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
```

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 10139  054032  010246                 MOV     R2,-(SP)        ;;PLSH R2 ON STACK
 10140  054034  104411           1$:   RDLIN                   ;;READ AN ASCIZ LINE
 10141  054036  012600                 MOV     (SP)+,R0        ;;GET ADDRESS OF 1ST CHARACTER
 10142  054040  010037  054144         MOV     R0,5$           ;;AND SAVE IT
 10143  054044  005001                 CLR     R1              ;;CLEAR DATA WORD
 10144  054046  005002                 CLR     R2
 10145  054050  112046           2$:   MOVB    (R0)+,-(SP)     ;;PICKUP THIS CHARACTER
 10146  054052  001420                 BEQ     3$              ;;IF ZERO GET OUT
 10147  054054  122716  000060         CMPB    #'0,(SP)        ;;MAKE SURE THIS CHARACTER
 10148  054060  003026                 BGT     4$              ;;IS AN OCTAL DIGIT
 10149  054062  122716  000067         CMPB    #'7,(SP)
 10150  054066  002423                 BLT     4$
 10151  054070  006301                 ASL     R1              ;;*2
 10152  054072  006102                 ROL     R2
 10153  054074  006301                 ASL     R1              ;;*4
 10154  054076  006102                 ROL     R2
 10155  054100  006301                 ASL     R1              ;;*8
 10156  054102  006102                 ROL     R2
 10157  054104  042716  177770         BIC     #^C7,(SP)       ;;STRIP THE ASCII JUNK
 10158  054110  062601                 ADD     (SP)+,R1        ;;ADD IN THIS DIGIT
 10159  054112  000756                 BR      2$              ;;LOOP
 10160  054114  005726           3$:   TST     (SP)+           ;;CLEAN TERMINATOR FROM STACK
 10161  054116  010166  000012         MOV     R1,12(SP)       ;;SAVE THE RESULT
 10162  054122  010237  054154         MOV     R2,$HIOCT
 10163  054126  012602                 MOV     (SP)+,R2        ;;POP STACK INTO R2
 10164  054130  012601                 MOV     (SP)+,R1        ;;POP STACK INTO R1
 10165  054132  012600                 MOV     (SP)+,R0        ;;POP STACK INTO R0
 10166  054134  000002                 RTI                     ;;RETURN
 10167  054136  005726           4$:   TST     (SP)+           ;;CLEAN PARTIAL FROM STACK
 10168  054140  105010                 CLRB    (R0)            ;;SET A TERMINATOR
 10169  054142  104401                 TYPE                    ;;TYPE UP THRU THE BAD CHAR.
 10170  054144  000000           5$:   .WORD   0
 10171  054146  104401  001204         TYPE    ,$QUES          ;;"?" "CR" & "LF"
 10172  054152  000730                 BR      1$              ;;TRY AGAIN
 10173  054154  000000           $HIOCT: .WORD  0               ;;HIGH ORDER BITS GO HERE
 10174                          .SBTTL  DOUBLE LENGTH BINARY TO OCTAL ASCII CONVERT ROUTINE
 10175
 10176                          ;;*****************************************************************
 10177                          ;*THIS ROUTINE WILL CONVERT A 32-BIT UNSIGNED BINARY NUMBER TO AN
 10178                          ;*UNSIGNED OCTAL ASCIZ NUMBER.
 10179                          ;*CALL
 10180                          ;*      MOV     #PNTR,-(SP)     ;;POINTER TO LOW WORD OF BINARY NUMBER
 10181                          ;*      JSR     PC,@#$DB20      ;;CALL THE ROUTINE
 10182                          ;*      RETURN                  ;;THE ADDRESS OF THE FIRST ASCIZ CHAR. IS ON THE STACK
 10183
 10184
 10185  054156  104413           $DB20:  SAVREG                ;;SAVE ALL REGISTERS
 10186  054160  016601  000002         MOV     2(SP),R1        ;;PICKUP THE POINTER TO LOW WORD
 10187  054164  012705  054275         MOV     #$OCTVL+13.,R5  ;;POINTER TO DATA TABLE
 10188  054170  012704  000014         MOV     #12.,R4         ;;DO ELEVEN CHARACTERS
 10189  054174  012703  177770         MOV     #^C7,R3         ;;MASK
 10190  054200  012100                 MOV     (R1)+,R0        ;;LOWER WORD
 10191  054202  012101                 MOV     (R1)+,R1        ;;HIGH WORD
 10192  054204  005002                 CLR     R2              ;;TERMINATOR
 10193  054206  110245           1$:   MOVB    R2,-(R5)        ;;PUT CHARACTER IN DATA TABLE
 10194  054210  010002                 MOV     R0,R2           ;;GET THIS DIGIT
```

```
 10195  054212  005304                DEC     R4              ;;COUNT THIS CHARACTER
 10196  054214  003003                BGT     3$              ;;BR IF NOT THE LAST DIGIT
 10197  054216  001405                BEQ     2$              ;;BR IF IT IS THE LAST DIGIT
 10198  054220  005205                INC     R5              ;;ALL DIGITS DONE-ADJUST POINTER FOR FIRST
 10199  054222  010566  000002        MOV     R5,2(SP)        ;;ASCIZ CHAR. & PUT IT ON THE STACK
 10200  054226  104414                RESREG                  ;;RESTORE ALL REGISTERS
 10201  054230  000207                RTS     PC              ;;RETURN TO USER
 10202  054232  006203        2$:     ASR     R3              ;;POSITION THE MASK FOR THE LAST DIGIT
 10203  054234  006001        3$:     ROR     R1              ;;POSITION THE BINARY NUMBER FOR
 10204  054236  006000                ROR     R0              ;;      THE NEXT OCTAL DIGIT
 10205  054240  006001                ROR     R1
 10206  054242  006000                ROR     R0
 10207  054244  006301                ROR     R1
 10208  054246  006000                ROR     R0
 10209  054250  040302                BIC     R3,R2           ;;MASK OUT ALL JUNK
 10210  054252  062702  000060        ADD     #'0,R2          ;;MAKE THIS CHAR. ASCII
 10211  054256  000753                BR      1$              ;;GO PUT IT IN THE DATA TABLE
 10212  054260  000016        $OCTVL: .BLKB   14.             ;;RESERVE DATA TABLE
 10213                          .SBTTL  SINGLE LENGTH BINARY TO DECIMAL ASCIZ ROUTINE
 10214
 10215                          ;;*****************************************************************
 10216                          ;*THIS ROUTINE WILL CONVERT A 16-BIT UNSIGNED BINARY NUMBER TO AN
 10217                          ;*UNSIGNED DECIMAL ASCIZ NUMBER.
 10218                          ;*CALL
 10219                          ;*      MOV     NUMBER,-(SP)    ;;PUT BINARY NUMBER ON THE STACK
 10220                          ;*      JSR     PC,@#$SB2D      ;;CALL
 10221                          ;*      RETURN                  ;;ADDRESS OF THE 1ST ASCIZ CHAR.IS ON THE STACK
 10222
 10223
 10224  054276  016637  000002  054326  $SB2D:  MOV     2(SP),1$        ;;SAVE BINARY NUMBER
 10225  054304  012746  054326                MOV     #1$,-(SP)       ;;SET POINTER
 10226  054310  004737  054332                JSR     PC,@#$DB2D      ;;CALL DOUBLE LENGTH CONVERT
 10227  054314  062716  000005                ADD     #5,(SP)         ;;ONLY ALLOW FIVE CHARACTERS
 10228  054320  012666  000002                MOV     (SP)+,2(SP)     ;;PICKUP POINTER
 10229  054324  000207                        RTS     PC              ;;RETURN
 10230  054326  000000  000000        1$:     .WORD   0,0
 10231                          .SBTTL  DOUBLE LENGTH BINARY TO DECIMAL ASCII CONVERT ROUTINE
 10232
 10233                          ;;*****************************************************************
 10234                          ;*THIS ROUTINE WILL CONVERT A 32-BIT BINARY NUMBER TO AN UNSIGNED
 10235                          ;*DECIMAL (ASCII) NUMBER. THE SIGN OF THE BINARY NUMBER MUST BE
 10236                          ;*POSITIVE.
 10237                          ;*CALL
 10238                          ;*      MOV     #PNTR,-(SP)     ;;POINTER TO LOW WORD OF BINARY NUMBER
 10239                          ;*      JSR     PC,@#$DB2D
 10240                          ;*      RETURN                  ;;THE FIRST ADDRESS OF ASCIZ
 10241                                                          ;;IS ON THE STACK
 10242
 10243
 10244  054332  104413                $DB2D:  SAVREG                  ;;SAVE REGISTERS
 10245  054334  016602  000002                MOV     2(SP),R2        ;;PICKUP THE DATA POINTER
 10246  054340  012700  054512                MOV     #$DECVL,R0      ;;GET ADDRESS OF "$DECVL" STRING
 10247  054344  010066  000002                MOV     R0,2(SP)        ;;PUT ADDRESS OF ASCIZ STRING ON STACK
 10248  054350  012201                        MOV     (R2)+,R1        ;;PICKUP THE BINARY NUMBER
 10249  054352  012202                        MOV     (R2)+,R2
 10250  054354  012737  000012  054430        MOV     #10.,4$         ;;SET UP TO DO 10 CONVERSIONS
```

```
 10225  054362  012704  054442          MOV     #$TNPWR,R4      ;;ADDRESS OF TEN POWER
 10226  054366  012705  054444          MOV     #$TNPWR+2,R5
 10253  054372  005003                  1$:     CLR     R3              ;;CLEAR PARTIAL
 10254  054374  161401                  2$:     SUB     (R4),R1         ;;SUBTRACT TEN POWER
 10255  054376  005602                          SBC     R2
 10256  054400  161502                          SUB     (R5),R2
 10257  054402  002402                          BLT     3$              ;;BR IF TEN POWER TO LARGE
 10258  054404  005203                          INC     R3              ;;ADD 1 TO PARTIAL
 10259  054406  000772                          BR      2$              ;;LOOP
 10260  054410  062401                  3$:     ADD     (R4)+,R1        ;;RESTORE SUBTRACTED VALUE
 10261  054412  005502                          ADC     R2
 10262  054414  062402                          ADD     (R4)+,R2
 10263  054416  022525                          CMP     (R5)+,(R5)+     ;;MOVE TO NEXT TEN POWER
 10264  054420  052703  000060                  BIS     #'0,R3          ;;CHANGE PARTIAL TO ASCII
 10265  054424  110320                          MOVB    R3,(R0)+        ;;SAVE IT
 10266  054426  005327                          DEC     (PC)+           ;;DONE?
 10267  054430  000000                  4$:     .WORD   0
 10268  054432  001357                          BNE     1$              ;;BR IF NO
 10269  054434  105020                          CLRB    (R0)+           ;;TERMINATOR
 10270  054436  104414                          RESREG                  ;RESTORE REGISTERS
 10271  054440  000207                          RTS     PC              ;;RETURN
 10272  054442  145000                  $TNPWR: 145000                  ;;1.0E09
 10273  054444  035632                          35632
 10274  054446  160400                          160400                  ;;1.0E08
 10275  054450  002765                          2765
 10276  054452  113200                          113200                  ;;1.0E07
 10277  054454  000230                          230
 10278  054456  041100                          041100                  ;;1.0E06
 10279  054460  000017                          17
 10280  054462  103240                          103240                  ;;1.0E05
 10281  054464  000001                          1
 10282  054466  023420                          23420                   ;;1.0E04
 10283  054470  000000                          0
 10284  054472  001750                          1750                    ;;1.0E03
 10285  054474  000000                          0
 10286  054476  000144                          144                     ;;1.0E02
 10287  054500  000000                          0
 10288  054502  000012                          12                      ;;1.0E01
 10289  054504  000000                          0
 10290  054506  000001                          1                       ;;1.0E00
 10291  054510  000000                          0
 10292  054512  000014                  $DECVL: .BLKB   12.             ;;RESERVE STORAGE FOR ASCIZ STRING
 10293                                  .SBTTL  TYPE NUMERICAL ASCIZ STRING SUPPRESS LEADING ZEROS
 10294
 10295                                  ;;**********************************************************************
 10296                                  ;*THIS ROUTINE IS USED TO TYPE AN ASCIZ NUMBER SUPPRESSING THE
 10297                                  ;*LEADING NUMBERS.
 10298                                  ;*CALL
 10299                                  ;*      MOV     #NUMADR,-(SP)   ;;FIRST ADDRESS OF ASCIZ STRING
 10300                                  ;*      JSR     PC,@#$SUPRS
 10301
 10302
 10303  054526  010046                  $SUPRS: MOV     R0,-(SP)        ;;SAVE R0
 10304  054530  016600  000004                  MOV     4(SP),R0        ;;PICKUP THE POINTER
 10305  054534  105710                  1$:     TSTB    (R0)            ;;TERMINATEOR?
 10306  054536  001403                          BEQ     2$              ;;BR IF YES
```

```
 10307  054540  122720  000060          CMPB    #'0,(R0)+       ;;IS THIS AN ASCII "0" ?
 10308  054544  001773                  BEQ     1$              ;;BR IF YES
 10309  054546  005300                  DEC     R0              ;;BACKUP BY "1"
 10310  054550  010037  054556  2$:     MOV     R0,3$           ;;SAVE FOR TYPING
 10311  054554  104401                  TYPE                    ;;GO TYPE
 10312  054556  000000          3$:     .WORD   0               ;;ASCIZ POINTER GOES HERE
 10313  054560  012600                  MOV     (SP)+,R0        ;;RESTORE R0
 10314  054562  012616                  MOV     (SP)+,(SP)      ;;RESTORE THE STACK
 10315  054564  000207                  RTS     PC              ;;RETURN
 10316                          .SBTTL  SAVE AND RESTORE R0-R5 ROUTINES
 10317
 10318                          ;;**************************************************************
 10319                          ;*SAVE R0-R5
 10320                          ;*CALL:
 10321                          ;*      SAVREG
 10322                          ;*UPON RETURN FROM $SAVREG THE STACK WILL LOOK LIKE:
 10323                          ;*
 10324                          ;*TOP---(+16)
 10325                          ;* +2---(+18)
 10326                          ;* +4---R5
 10327                          ;* +6---R4
 10328                          ;* +8---R3
 10329                          ;*+10---R2
 10330                          ;*+12---R1
 10331                          ;*+14---R0
 10332
 10333  054566                  $SAVREG:
 10334  054566  010046                  MOV     R0,-(SP)        ;;PUSH R0 ON STACK
 10335  054570  010146                  MOV     R1,-(SP)        ;;PUSH R1 ON STACK
 10336  054572  010246                  MOV     R2,-(SP)        ;;PUSH R2 ON STACK
 10337  054574  010346                  MOV     R3,-(SP)        ;;PUSH R3 ON STACK
 10338  054576  010446                  MOV     R4,-(SP)        ;;PUSH R4 ON STACK
 10339  054600  010546                  MOV     R5,-(SP)        ;;PUSH R5 ON STACK
 10340  054602  016646  000022          MOV     22(SP),-(SP)    ;;SAVE PS OF MAIN FLOW
 10341  054606  016646  000022          MOV     22(SP),-(SP)    ;;SAVE PC OF MAIN FLOW
 10342  054612  016646  000022          MOV     22(SP),-(SP)    ;;SAVE PS OF CALL
 10343  054616  016646  000022          MOV     22(SP),-(SP)    ;;SAVE PC OF CALL
 10344  054622  000002                  RTI
 10345
 10346                          ;*RESTORE R0-R5
 10347                          ;*CALL:
 10348                          ;*      RESREG
 10349  054624                  $RESREG:
 10350  054624  012666  000022          MOV     (SP)+,22(SP)    ;;RESTORE PC OF CALL
 10351  054630  012666  000022          MOV     (SP)+,22(SP)    ;;RESTORE PS OF CALL
 10352  054634  012666  000022          MOV     (SP)+,22(SP)    ;;RESTORE PC OF MAIN FLOW
 10353  054640  012666  000022          MOV     (SP)+,22(SP)    ;;RESTORE PS OF MAIN FLOW
 10354  054644  012605                  MOV     (SP)+,R5        ;;POP STACK INTO R5
 10355  054646  012604                  MOV     (SP)+,R4        ;;POP STACK INTO R4
 10356  054650  012603                  MOV     (SP)+,R3        ;;POP STACK INTO R3
 10357  054652  012602                  MOV     (SP)+,R2        ;;POP STACK INTO R2
 10358  054654  012601                  MOV     (SP)+,R1        ;;POP STACK INTO R1
 10359  054656  012600                  MOV     (SP)+,R0        ;;POP STACK INTO R0
 10360  054660  000002                  RTI
 10361                          .SBTTL  TRAP DECODER
 10362
```

```
                        ;;**********************************************************************
                        ;*THIS ROUTINE WILL PICK UP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
                        ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
                        ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
                        ;*GO TO THAT ROUTINE.

054662  010046          $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
000002                          MOV     2(SP),R0        ;;GET TRAP ADDRESS
                                TST     -(R0)           ;;BACKUP BY 2
                                MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
                                ASL     R0              ;;POSITION FOR INDEXING
054716                          MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
                                RTS     R0              ;;GO TO ROUTINE


                        ;;THIS IS USE TO HANDLE THE "GETPRI" MACRO

054704  011646          $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
000004  000002                  MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
                                RTI                     ;;RESTORE THE PSW

                        .SBTTL  TRAP TABLE

                        ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
                        ;*BY THE "TRAP" INSTRUCTION.

                        ;       ROUTINE
                        ;       -------
054716  054704  $TRPAD:  .WORD   $TRAP2
                $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
                $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
                $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
                $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
                $TYPDS  ;;CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)

054732  053134          $GTSWR  ;;CALL=GTSWR    TRAP+6(104406)  GET SOFT-SWR SETTING

                $CKSWR  ;;CALL=CKSWR    TRAP+7(104407)  TEST FOR CHANGE IN SOFT-SWR
                $RDCHR  ;;CALL=RDCHR    TRAP+10(104410) TTY TYPEIN CHARACTER ROUTINE
                $RDLIN  ;;CALL=RDLIN    TRAP+11(104411) TTY TYPEIN STRING ROUTINE
                $RDOCT  ;;CALL=RDOCT    TRAP+12(104412) READ AN OCTAL NUMBER FROM TTY
                $SAVREG ;;CALL=SAVREG   TRAP+13(104413) SAVE R0-R5 ROUTINE
                $RESREG ;;CALL=RESREG   TRAP+14(104414) RESTORE R0-R5 ROUTINE
                $COP1$  ;;CALL=SCOP1    TRAP+15(104415) INTERNAL LOOP ON ERROR
```

```
                                .SBTTL  SERVICE MSGS
                                .EVEN
035752  000062                  BSE22S: .BLKW   50.              ;22 SECTOR SOFTWARE INFO

                                MSG1:   .ASCII  <CR><LF>/UNIBUS RH06 DRIVE DIAGNOSTIC/

                                        .ASCII  <CR><LF>        PART 1  /

                                        .ASCII  <CR><LF>/MAINDEC-11-DZRH6-C-PB/<CR><LF>

                                        .ASCII  <CR><LF>/       *** CAUTION ***/<CR><LF>

                                        .ASCII  <CR><LF>/THIS PROGRAM SHOULD BE HALTED ONLY BY TYPING CONTROL-C/

                                .ASCII  <CR><LF>/OTHERWISE, CARTRIDGE FORMATTING AND,OR THE DRIVE/

                                .ASCII  <CR><LF>/MAY BE LEFT IN AN UNDETERMINED STATE/<CR><LF>

                                .ASCII  <CR><LF>/INITIALLY, DRIVES TO BE TESTED SHOULD HAVE:/<CR><LF>
```

```
 :0464  055544  005015  027101  020040          .ASCII  <CR><LF>/A.  HEADS MANUALLY LOADED/
 :0465  055552  042525  042101  020123
 :0466  055560  020015  020525  046101
 :0467  055566  054015  046040  040517
 :0468  055574  042524      124
 :0469  055577      015  041512  020056          .ASCII  <CR><LF>/B.  CORRECT PORT SELECTED/
 :0470  055604  041440  051117  042522
 :0471  055612  052103  053040  051117
 :0472  055620  020124  042523  042514
 :0473  055626  052103  042105
 :0474  055632  005015  027103  020040          .ASCII  <CR><LF>/C.  WRITE LOCK DISABLED/
 :0475  055640  051127  052111  020105
 :0476  055646  047514  045503  042040
 :0477  055654  051511  041101  042514
 :0478  055662      104
 :0479  055663      015  042012  020056          .ASCII  <CR><LF>/D.  DRIVE READY INDICATOR ON/<CR><LF>
 :0480  055670  042040  044522  042526
 :0481  055676  051040  040505  054504
 :0482  056004  044440  042116  041511
 :0483  056012  052101  051117  047440
 :0484  056020  006516      012
 :0485  056023      015  042012  044522          .ASCII  <CR><LF>/DRIVES NOT TO BE TESTED MUST HAVE BOTH/
 :0486  056030  042526  020123  047516
 :0487  056036  020124  047524  041040
 :0488  056044  020105  042524  052123
 :0489  056052  042105  046440  051525
 :0490  056060  020124  040510  042526
 :0491  056066  041040  052117      110
 :0492  056073      015  050012  051117          .ASCIZ  <CR><LF>/PORTS DESELECTED/<CR><LF>
 :0493  056000  051524  042040  051505
 :0494  056006  046105  041505  042524
 :0495  056014  006504  000012
 :0496
 :0497
 :0498
 :0499
10500  056020  005015  052520  020124  MSG2:   .ASCIZ  <CR><LF>/PUT SCRATCH PACK IN DRIVE 0/
10501  056026  041523  040522  041524
10502  056034  020110  040520  045503
10503  056042  044440  020116  051104
10504  056050  053111  020105  000060
10505  056056  005015  051104  053111  MSG3:   .ASCIZ  <CR><LF>/DRIVE(S) TO BE TESTED: /
10506  056064  024105  024523  052040
10507  056072  020117  042502  052040
10508  056100  051505  042524  035104
10509  056106  000040
10510  056110  005015  052502  020123  MSG4:   .ASCIZ  <CR><LF>/BUS ADDR (177440): /
10511  056116  042101  051104  024040
10512  056124  033461  032067  030064
10513  056132  035051  000040
10514  056136  005015  047503  052116  MSG5:   .ASCIZ  <CR><LF>/CONTR ADDR (210): /
10515  056144  020122  042101  051104
10516  056152  024040  030462  024460
10517  056160  020072      000
10518  056163      015  044412  052116  MSG6:   .ASCIZ  <CR><LF>/INTR AT PC=/
10519  056170  020122  052101  050040
```

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 10520  056176  036503     000
 10521  056201     015  042012  044522  MSG7:   .ASCIZ  <CR><LF>/DRIVE 0 WILL NOT BE TESTED/
 10522  056206  042526  030040  053440
 10523  056214  046111  020114  047516
 10524  056222  020124  042502  052040
 10525  056230  051505  042524  000104
 10526  056236  005015  042524  052123  MSG8:   .ASCIZ  <CR><LF>/TEST 16 TAKES 2 TO 4 MIN./<CR><LF>
 10527  056244  030440  020066  040524
 10530  056252  042513  020123  020062
 10531  056260  047524  032040  046440
 10532  056266  047111  006456  000012
 10533  056274  005015  054502  040520  MSG9:   .ASCIZ  <CR><LF>/BYPASSING TEST 16/<CR><LF>
 10534  056302  051523  047111  020107
 10535  056310  042524  052123  030440
 10536  056316  006466  000012
 10537  056322  005015  053412  046111  MSG10:  .ASCIZ  <CR><LF><LF>/WILL TEST DRIVES:/
 10540  056330  020114  042524  052123
 10541  056336  042040  044522  042526
 10542  056344  035123     000
 10543  056347     015  005012  047520  MSG11:  .ASCIZ  <CR><LF><LF>/POWER UP RESTART TO TEST 1/<CR><LF>
 10544  056354  042527  020122  050125
 10545  056362  051040  051505  040524
 10546  056370  052122  052040  020117
 10547  056376  042524  052123  030440
 10550  056404  005015     000
 10551  056407     015  050012  041501  MSG12:  .ASCIZ  <CR><LF>/PACK BEING FORMATTED/<CR><LF>
 10552  056414  020123  042502  047111
 10553  056422  020107  047506  046522
 10554  056430  052101  042524  006504
 10555  056436  000012
 10556  056440  005015  047516  046040  MSG13:  .ASCII  <CR><LF>/NO L OR P CLOCKS/
 10557  056446  047440  020122  020120
 10560  056454  046103  041517  051513
 10561  056462  005015  046101  020114          .ASCIZ  <CR><LF>/ALL TIMING TESTS BYPASSED/
 10562  056470  044524  044515  043516
 10563  056476  052040  051505  051524
 10564  056504  041040  050131  051501
 10565  056512  042523  000104
 10566  056516  005015  054502  040520  MSG14:  .ASCIZ  <CR><LF>/BYPASSING DRIVE /
 10567  056524  051523  047111  020107
 10570  056532  051104  053111  020105
 10571  056540     000
 10572  056541     015  005012  051104  MSG15:  .ASCIZ  <CR><LF><LF>/DRIVE /
 10573  056546  053111  020105     000
 10574  056553     015  042012  044522  MSG16:  .ASCIZ  <CR><LF>/DRIVE SER #/
 10575  056560  042526  051440  051105
 10576  056566  021440     000
 10577  056571     015  041412  051101  MSG17:  .ASCIZ  <CR><LF>/CART SER #/
 10600  056576  020124  042523  020122
 10601  056604  000043
 10602  056606  005015  040412  047502  MSG18:  .ASCIZ  <CR><LF><LF>/ABORTING BAL OF TESTS/<CR><LF><LF>
 10603  056614  052122  047111  020107
 10604  056622  040502  020114  043117
 10605  056630  052040  051505  051524
 10606  056636  005015  000012
 10607  056642  005015  040412  046114  MSG19:  .ASCIZ  <CR><LF><LF>/ALL DRIVES TESTED/<CR><LF><LF>
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10576  056650  042040  044522  042526
10577  056656  020123  042524  052123
10578  056664  042105  005015  000012
10579  056672  005015  047515  044504  MSG20:  .ASCII  <CR><LF>/MODIFIED VERSION OF FORMAT PACK TEST FOR MODULE TESTING/
10580  056700  044506  042105  053040
10581  056706  051105  044523  047117
10582  056714  047440  020106  047506
10583  056722  046522  052101  050040
10584  056730  041501  020113  042524
10585  056736  052123  043040  051117
10586  056744  046440  042117  046125
10587  056752  020105  042524  052123
10588  056760  047111     107
10589  056763     015  052012  020117          .ASCIZ  <CR><LF>/TO RESTORE HEADERS ON CYL 0 & 1, ALL TRACKS/
10590  056770  042522  052123  051117
10591  056776  020105  042510  042101
10592  057004  051105  020123  047117
10593  057012  041440  046131  030040
10594  057020  023040  030440  020054
10595  057026  046101  020114  051124
10596  057034  041501  051513     000
10597  057041     015  041012  050131  MSG21:  .ASCIZ  <CR><LF>/BYPASSING TESTS 36,40,41 FOR MODULE TESTING/<CR><LF>
10598  057046  051501  044523  043516
10599  057054  052040  051505  051524
10600  057062  031440  026066  030064
10601  057070  032054  020061  047506
10602  057076  020122  047515  052504
10603  057104  042514  052040  051505
10604  057112  044524, 043516  005015
10605  057120     000
10606  057121     015  043012  051117  MSG22:  .ASCIZ  <CR><LF>/FORMATTING FINISHED/<CR><LF>
10607  057126  040515  052124  047111
10608  057134  020107  044506  044516
10609  057142  044123  042105  005015
10610  057150     000
10611
10612  057151     015  050012  046507  MSG74:  .ASCIZ  <CR><LF>/PGM ABORT PENDING.../
10613  057156  040440  047502  052122
10614  057164  050040  047105  044504
10615  057172  043516  027056  000056
10616  057200  005015  040510  052114  MSG75:  .ASCIZ  <CR><LF>/HALT PENDING.../
10617  057206  050040  047105  044504
10618  057214  043516  027056  000056
10619  057222  005015  043520  020115  MSG76:  .ASCIZ  <CR><LF>/PGM ABORTED/
10620  057230  041101  051117  042524
10621  057236  000104
10622  057240  005015  050103  020125  MSG77:  .ASCIZ  <CR><LF>/CPU HALTED/
10623  057246  040510  052114  042105
10624  057254     000
10625
10626
10627                                  .SBTTL  ERR MSGS
10628
10629  057255     015  042412  051122  EM1:    .ASCIZ  <CR><LF>/ERR, ONLY 0 THRU 7 ALLOWED, TRY AGAIN/<CR><LF>
10630  057262  020054  047117  054514
10631  057270  030040  052040  051110
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 10632  057724  020125  020067  046101
 10633  057732  042514  042523  026124
 10634  057740  052040  054522  040445
 10635  057746  040523  047111  005015
 10636  057754      000
 10637  057755      123  046105  041505  EM2:    .ASCIZ  SELECTED DRIVE # IN RKCS2 CANNOT BE READ BACK IN RKMR2/
 10638  057764  042524  020124  051124
 10639  057772  053111  020105  020043
 10640  060000  047111  051040  041513
 10641  060006  031123  041440  047101
 10642  060014  042516  020124  042502
 10643  060022  051040  040505  020104
 10644  060030  040502  045503  044440
 10645  060036  020116  045522  051115
 10646  060044  000062
 10647  060046  005015  041101  051117  EM3:    .ASCIZ  <CR><LF>/ABORT TESTS...UNEXP TIME OUT AT PC=/
 10648  060054  020124  042524  052123
 10649  060062  027123  027056  047125
 10650  060070  054105  020120  044524
 10651  060076  042515  047440  052125
 10652  060104  040440  020124  041520
 10653  060112  000075
 10654  060114  042115  020123  042523  EM5:    .ASCIZ  /MDS SET IN RKCS2/
 10655  060122  020124  047111  051040
 10656  060130  041513  031123      000
 10657  060135      125  042506  051440  EM6:    .ASCIZ  /UFE SET IN RKCS2/
 10658  060143  052105  044440  020116
 10659  060151  045522  051503  000062
 10660  060157  051104  020101  047111  EM7:    .ASCIZ  /DRA IN RKDS & NED IN RKCS2 RESET; WRONG PORT SELECTED"/
 10661  060165  051040  042113  020123
 10662  060173  020046  042516  020104
 10663  060201  047111  051040  041513
 10664  060207  031123  051040  051505
 10665  060215  052105  020073  051127
 10666  060223  047117  020107  047520
 10667  060231  052122  051440  046105
 10668  060237  041505  042524  037504
 10669  060245      000
 10670  060246      104  044522  042526  EM8:    .ASCIZ  DRIVE PRESENT BUT NOT TYPED BY OPERATOR/
 10671  060254  050040  042522  042523
 10672  060262  052116  041040  052125
 10673  060270  047040  052117  052040
 10674  060276  050131  042105  041040
 10675  060304  020131  050117  051105
 10676  060312  052101  051117      000
 10677  060317      104  044522  042526  EM9:    .ASCIZ  /DRIVE NOT PRESENT BUT TYPED BY OPERATOR/
 10678  060325  047040  052117  050040
 10679  060333  042522  042523  052116
 10680  060341  041040  052125  052040
 10681  060347  050131  042105  041040
 10682  060355  020131  050117  051105
 10683  060363  052101  051117      000
 10684  060370      101  047502  052122  EM10:   .ASCIZ  /ABORT TESTS...CANNOT REF CONTR REG/
 10685  060376  052040  051505  051524
 10686  060404  027056  041456  047103
 10687  060412  047516  020124  042522
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 10688  057764  020106  047503  052116
 10689  057772  020122  042522  000107
 10690  060000  051104  020101  047111  EM11:   .ASCIZ  /DRA IN RKDS & NED IN RKCS2 BOTH SET/
 10691  060006  051040  042113  020123
 10692  060014  020046  042516  020104
 10693  060022  047111  051040  041513
 10694  060030  031123  041040  052117
 10695  060036  020110  042523  000124
 10696  060044  047503  052116  020122  EM12:   .ASCIZ  /CONTR NOT READY IN RKCS1/
 10697  060052  047516  020124  042522
 10698  060060  042101  020131  047111
 10699  060066  051040  041513  030523
 10700  060074      000
 10701  060075      116  020117  052101  EM13:   .ASCIZ   NO ATTN IN RKASOF/
 10702  060102  047124  044440  020116
 10703  060110  045522  051501  043117
 10704  060116      000
 10705  060117      127  047522  043516  EM14:   .ASCIZ  /WRONG ATTN IN RKASOF/
 10706  060124  042440  052124  020116
 10707  060132  047111  051040  040513
 10708  060140  047523  000106
 10709  060144  051104  054524  047040  EM15:   .ASCIZ  /DRDY NOT CLEARED IN RKMR2/
 10710  060152  052117  041440  042514
 10711  060160  051101  042105  044440
 10712  060166  020116  045522  051115
 10713  060174  000062
 10714  060176  051504  020103  047516  EM16:   .ASCIZ  /DSC NOT SET IN RKMR2/
 10715  060204  020124  042523  020124
 10716  060212  047111  051040  046513
 10717  060220  031122      000
 10718  060223      115  043523  040440  EM17:   .ASCIZ  /MSG A0 ERR/
 10719  060230  020060  051105  000122
 10720  060236  051515  020107  030102  EM18:   .ASCIZ  /MSG B0 ERR/
 10721  060244  042440  051122      000
 10722  060251      115  043523  040440  EM19:   .ASCIZ  /MSG A1 ERR/
 10723  060256  020061  051105  000122
 10724  060264  051515  020107  030502  EM20:   .ASCIZ  /MSG B1 ERR/
 10725  060272  042440  051122      000
 10726  060277      103  051105  020122  EM21:   .ASCIZ   CERR SET IN RKCS1/
 10727  060304  042523  020124  047111
 10728  060312  051040  041513  030523
 10729  060320      000
 10730  060321      122  051514  044440  EM22:   .ASCIZ  /RLS IN RKCS2 SET CERR IN RKCS1/
 10731  060326  020116  045522  051503
 10732  060334  020062  042523  020124
 10733  060342  042503  051122  044440
 10734  060350  020116  045522  051503
 10735  060356  000061
 10736  060360  043125  020105  047111  EM23:   .ASCIZ  /UFE IN RKCS2 SET (SACK) AFTER RLS IN RKCS2 SENT/
 10737  060366  051040  041513  031123
 10738  060374  051440  052105  024040
 10739  060402  040523  045503  020051
 10740  060410  043101  042524  020122
 10741  060416  046122  020123  047111
 10742  060424  051040  041513  031123
 10743  060432  051440  047105  000124
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 10744  060440  053126  047040  052117  EM24:   .ASCIZ  /VV NOT SET IN RKMR2/
 10745  060446  051440  052105  044440
 10746  060454  020116  045522  051115
 10747  060462  000062
 10748  060464  051104  020126  054524  EM25:   .ASCIZ  /DRV TYPE SET IN RKMR2/
 10749  060472  042520  051440  052105
 10750  060500  044440  020116  045522
 10751  060506  051115  000062
 10752  060512  042104  020124  042523  EM26:   .ASCIZ  /DOT SET IN RKDS/
 10753  060520  020124  047111  051040
 10754  060526  042113  000123
 10755  060532  052104  042531  051440  EM27:   .ASCIZ  /DTYE SET IN RKER/
 10756  060540  052105  044440  020116
 10757  060546  045522  051105      000
 10758  060553      104  054524  020105  EM28:   .ASCIZ  /DTYE NOT SET IN RKER/
 10759  060560  047516  020124  042523
 10760  060566  020124  047111  051040
 10761  060574  042513  000122
 10762  060600  052104  042531  044440  EM29:   .ASCIZ  /DTYE IN RKER DID NOT SET CERR IN RKCS1/
 10763  060606  020116  045522  051105
 10764  060614  042040  042111  047040
 10765  060622  052117  051440  052105
 10766  060630  041440  051105  020122
 10767  060636  047111  051040  041513
 10768  060644  030523      000
 10769  060647      103  042055  050040  EM30:   .ASCIZ  /C-D PAR ERR SET IN RKMR3/
 10770  060654  051101  042440  051122
 10771  060662  051440  052105  044440
 10772  060670  020116  045522  051115
 10773  060676  000063
 10774  060700  026504  020103  040520  EM31:   .ASCIZ  /D-C PAR SET IN RKCS1/
 10775  060706  020122  042523  020124
 10776  060714  047111  051040  041513
 10777  060722  030523      000
 10778  060725      106  052114  047040  EM32:   .ASCIZ  /FLT NOT SET IN RKMR3/
 10779  060732  052117  051440  052105
 10780  060740  044440  020116  045522
 10781  060746  051115  000063
 10782  060752  026503  020104  040520  EM33:   .ASCIZ  /C-D PAR ERR NOT SET IN RKMR3/
 10783  060760  020122  051105  020122
 10784  060766  047516  020124  042523
 10785  060774  020124  047111  051040
 10786  061002  046513  031522      000
 10787  061007      104  041455  050040  EM34:   .ASCIZ  /D-C PAR NOT SET IN RKCS1/
 10788  061014  051101  047040  052117
 10789  061022  051440  052105  044440
 10790  061030  020116  045522  051503
 10791  061036  000061
 10792  061040  026504  020103  040520  EM35:   .ASCIZ  /D-C PAR IN RKCS1 DID NOT SET CERR IN RKCS1/
 10793  061046  020122  047111  051040
 10794  061054  041513  030523  042040
 10795  061062  042111  047040  052117
 10796  061070  051440  052105  041440
 10797  061076  051105  020122  047111
 10798  061104  051040  041513  030523
 10799  061112      000
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 10800  061113     103  046131  040440  EM36:   .ASCIZ  /CYL ADDR IN B2 NOT SAME AS RKDC/
 10801  061120  042104  020122  047111
 10802  061126  041040  020062  047516
 10803  061134  020124  040523  042515
 10804  061142  040440  020123  045522
 10805  061150  041504     000
 10806  061153     103  046131  042040  EM37:   .ASCIZ  /CYL DIFF IN A2 NOT SAME AS RKDC/
 10807  061160  043111  020106  047111
 10808  061166  040440  020062  047516
 10809  061174  020124  040523  042515
 10810  061202  040440  020123  045522
 10811  061210  041504     000
 10812  061213     103  046131  042040  EM38:   .ASCIZ  /CYL DIFF IN RKMR2 NOT SAME AS 'CYL DIFF'/
 10813  061220  043111  020106  047111
 10814  061226  051040  046513  031122
 10815  061234  047040  052117  051440
 10816  061242  046501  020105  051501
 10817  061250  023440  054503  020114
 10818  061256  044504  043106  000047
 10819  061264  054503  020114  044504  EM39:   .ASCIZ  /CYL DIFF & OFST IN A2 NOT =0/
 10820  061272  043106  023040  047440
 10821  061300  051506  020124  047111
 10822  061306  040440  020062  047516
 10823  061314  020124  030075     000
 10824  061321     103  046131  040440  EM40:   .ASCIZ  /CYL ADDR IN B2 NOT =0/
 10825  061326  042104  020122  047111
 10826  061334  041040  020062  047516
 10827  061342  020124  030075     000
 10828  061347     103  046131  040440  EM41:   .ASCIZ  /CYL ADDR IN B2 DID NOT REMAIN =0/
 10829  061354  042104  020122  047111
 10830  061362  041040  020062  044504
 10831  061370  020104  047516  020124
 10832  061376  042522  040515  047111
 10833  061404  036440  000060
 10834  061410  042510  042101  040440  EM43:   .ASCIZ  /HEAD ADDR IN B3 NOT =0/
 10835  061416  042104  020122  047111
 10836  061424  041040  020063  047516
 10837  061432  020124  030075     000
 10838  061437     110  040505  020104  EM44:   .ASCIZ  /HEAD DECODE IN B3 INCORRECT/
 10839  061444  042504  047503  042504
 10840  061452  044440  020116  031502
 10841  061460  044440  041516  051117
 10842  061466  042522  052103     000
 10843  061473     104  044522  042526  EM45:   .ASCII  /DRIVE READY IN RKMR2 NOT SET BY 1 SEC FROM FWD/
 10844  061500  051040  040505  054504
 10845  061506  044440  020116  045522
 10846  061514  051115  020062  047516
 10847  061522  020124  042523  020124
 10848  061530  054502  030440  051440
 10849  061536  041505  040040  047522
 10850  061544  020115  053506     104
 10851  061551     015  044412  020116          .ASCIZ  <CR><LF>/IN RTZ PORTION OF START SPIN CMD
 10852  061556  052122  020132  047520
 10853  061564  052122  047511  020116
 10854  061572  043117  051440  040524
 10855  061600  052122  051440  044520
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 10856  061606  020116  046503  000104
 10857  061614  051515  020107  031101  EM46:   .ASCIZ  /MSG A2 ERR/
 10858  061622  042440  051122     000
 10859  061627     115  043523  041040  EM47:   .ASCIZ  /MSG B2 ERR/
 10860  061634  020062  051105  000122
 10861  061642  051515  020107  031502  EM48:   .ASCIZ  /MSG B3 ERR/
 10862  061650  042440  051122     000
 10863  061655     106  042127  047040  EM49:   .ASCIZ  /FWD NOT SET IN RKMR2 IN RTZ PORTION OF START SPIN CMD/
 10864  061662  052117  051440  052105
 10865  061670  044440  020116  045522
 10866  061676  051115  020062  047111
 10867  061704  051040  055124  050040
 10868  061712  051117  044524  047117
 10869  061720  047440  020106  052123
 10870  061726  051101  020125  050123
 10871  061734  047111  041440  042115
 10872  061742     000
 10873  061743     106  042127  047040  EM50:   .ASCIZ  /FWD NOT SET IN RKMR2 FROM START SPIN CMD/
 10874  061750  052117  051440  052105
 10875  061756  044440  020116  045522
 10876  061764  051115  020062  051106
 10877  061772  046517  051440  040524
 10878  062000  052122  051440  044520
 10879  062006  020116  046503  000104
 10880  062014  053506  020104  047516  EM51:   .ASCIZ  /FWD NOT CLEARED IN RKMR2 BY 5 SEC OF MOTION FROM START SPIN CMD/
 10881  062022  020124  046103  040505
 10882  062030  042522  020104  047111
 10883  062036  051040  046513  031122
 10884  062044  041040  020131  020065
 10885  062052  042523  020103  043117
 10886  062060  046440  052117  047511
 10887  062066  020116  051106  046517
 10888  062074  051440  040524  051122
 10889  062102  051440  044520  020116
 10890  062110  046503  000104
 10891  062114  030062  051440  041505  EM52:   .ASCIZ  /20 SEC FORMAT NOT SET IN RkMR2/
 10892  062122  043040  051117  040515
 10893  062130  020124  047516  020124
 10894  062136  042523  020124  047111
 10895  062144  051040  046513  031122
 10896  062152     000
 10897  062153     123  041505  030040  EM53:   .ASCIZ  /SEC 0 NOT FOUND BY 50 MS/
 10898  062160  047040  052117  043040
 10899  062166  052517  042116  041040
 10900  062174  020131  030065  046440
 10901  062202  000123
 10902  062204  044504  043106  051440  EM54:   .ASCIZ  /DIFF SEC NOT FOUND BY 3 MS/
 10903  062212  041505  047040  052117
 10904  062220  043040  052517  042116
 10905  062226  041040  020131  020063
 10906  062234  051515     000
 10907  062237     101  052124  020116  EM55:   .ASCIZ  /ATTN NOT CLEARED IN RKASOF/
 10908  062244  047516  020124  046103
 10909  062252  040505  042522  020104
 10910  062260  047111  051040  040513
 10911  062266  047523  000106
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 10912  062272  047125  054105  020120  EM56:   .ASCIZ  /UNEXP MEM PAR TRAP/
 10913  062300  042515  020115  040520
 10914  062306  020122  051124  050101
 10915  062314     000
 10916  062315     127  042503  040040  EM57:   .ASCIZ  /WCE @ CYL 411. TRK 2, SEC 2/
 10917  062322  041440  046131  032040
 10918  062330  030461  020054  051124
 10919  062336  020113  026062  051440
 10920  062344  041505  031040     000
 10921  062351     015  051412  042520  EM58:   .ASCIZ  <CR><LF>/SPEED OK IN RKMR2 NOT =0 BY TIMEOUT/
 10922  062356  042105  047440  020113
 10923  062364  047111  051040  046513
 10924  062372  031122  047040  052117
 10925  062400  036440  020060  054502
 10926  062406  052040  046511  047505
 10927  062414  052125     000
 10928  062417     114  046511  042040  EM59:   .ASCIZ  /LIM DET NOT SET IN RKMR3/
 10929  062424  052105  047040  052117
 10930  062432  051440  052105  044440
 10931  062440  020116  045522  051115
 10932  062446  000063
 10933  062450  042510  042101  020123  EM60:   .ASCIZ  /HEADS HOME NOT SET IN RKMR2/
 10934  062456  047510  042515  047040
 10935  062464  052117  051440  052105
 10936  062472  044440  020116  045522
 10937  062500  051115  000062
 10938  062504  047514  042101  044040  EM61:   .ASCIZ  /LOAD HEADS NOT SET IN RKMR2/
 10939  062512  040505  051504  047040
 10940  062520  052117  051440  052105
 10941  062526  044440  020116  045522
 10942  062534  051115  000062
 10943  062540  046104  020124  042523  EM63:   .ASCIZ  /DLT SET IN RKCS2/
 10944  062546  020124  047111  051040
 10945  062554  041513  031123     000
 10946  062561     115  043523  041040  EM64:   .ASCIZ  /MSG B3 HEAD REG NOT =0/
 10947  062566  020063  042510  042101
 10948  062574  051040  043505  047040
 10949  062602  052117  036440  000060
 10950  062610  042522  042101  044040  EM65:   .ASCIZ  /READ HEADER ERR/
 10951  062616  040505  042504  020122
 10952  062624  051105  000122
 10953  062630  054503  020114  042101  EM66:   .ASCIZ  /CYL ADDR IN RKMR3 INCORRECT/
 10954  062636  051104  044440  020116
 10955  062644  045522  051115  020063
 10956  062652  047111  047503  051122
 10957  062660  041505  000124
 10958  062664  042522  042101  047111  EM67:   .ASCIZ  /READING CYL 0 HEADERS ON CYL 1/
 10959  062672  020107  054503  020114
 10960  062700  020060  042510  042101
 10961  062706  051105  020123  047117
 10962  062714  041440  046131  030440
 10963  062722     000
 10964  062723     122  040505  044504  EM68:   .ASCIZ  /READING CYL 1 HEADERS ON CYL 0/
 10965  062730  043516  041440  046131
 10966  062736  030440  044040  040505
 10967  062744  042504  051522  047440
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 10968  062752  020116  054503  020114
 10969  062760  000060
 10970  062762  046101  043511  020116  EM69:   .ASCIZ  /ALIGN CART USED/
 10971  062770  040503  052122  052440
 10972  062776  042523  000104
 10973  063002  047125  054105  020120  EM70:   .ASCIZ  /UNEXP ATTN/
 10974  063010  052101  047124     000  EM71:   .ASCIZ  /DSC SET IN RKMR2/
 10975  063015     104  041523  051440
 10976  063022  052105  044440  020116
 10977  063030  045522  051115  000062
 10978  063036  047506  046522  052101  EM72:   .ASCIZ  /FORMAT TEST BYPASSED/
 10979  063044  052040  051505  020124
 10980  063052  054502  040520  051523
 10981  063060  042105     000
 10982  063063     103  047524  051440  EM73:   .ASCIZ  /CTO SET IN RKCS1/
 10983  063070  052105  044440  020116
 10984  063076  045522  051503  000061
 10985  063104  052122  020132  047516  EM74:   .ASCIZ  /RTZ NOT SET IN RKMR2/
 10986  063112  020124  042523  020124
 10987  063120  047111  051040  046513
 10988  063126  031122     000
 10989  063131     111  040504  020105  EM75:   .ASCIZ  /IDAE NOT SET IN RKMR3/
 10990  063136  047516  020124  042523
 10991  063144  020124  047111  051040
 10992  063152  046513  031522     000
 10993  063157     120  050111  051440  EM76:   .ASCIZ  /PIP SET IN RKMR2/
 10994  063164  052105  044440  020116
 10995  063172  045522  051115  000062
 10996  063200  040506  046125  020124  EM77:   .ASCIZ  /FAULT NOT =0 IN RKMR3/
 10997  063206  047516  020124  030075
 10998  063214  044440  020116  045522
 10999  063222  051115  000063
 11000  063226  054503  020114  044504  EM78:   .ASCIZ  /CYL DIFF IN RKMR2 DID NOT REMAIN = 1 IN SEEK TO SELF/
 11001  063234  043106  044440  020116
 11002  063242  045522  051115  020062
 11003  063250  044504  020104  047516
 11004  063256  020124  042522  040515
 11005  063264  047111  036440  030440
 11006  063272  044440  020116  042523
 11007  063300  045505  052040  020117
 11008  063306  042523  043114     000
 11009  063313     116  042105  051440  EM79:   .ASCIZ  /NED SET IN RKCS2/
 11010  063320  052105  044440  020116
 11011  063326  045522  051503  000062
 11012  063334  047125  047514  042101  EM80:   .ASCIZ  /UNLOAD NOT SET IN RKMR2/
 11013  063342  047040  052117  051440
 11014  063350  052105  044440  020116
 11015  063356  045522  051115  000062
 11016  063364  050123  047111  047040  EM81:   .ASCIZ  /SPIN NOT SET IN RKMR2/
 11017  063372  052117  051440  052105
 11018  063400  044440  020116  045522
 11019  063406  051115  000062
 11020  063412  052122  020132  047516  EM82:   .ASCIZ  /RTZ NOT SET IN RKMR2/
 11021  063420  020124  042523  020124
 11022  063426  047111  051040  046513
 11023  063434  031122     000
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11024  063437     122  040505  020104  EM83:   .ASCIZ  /READ HEADER ERR   WORD 0 (CYL#)/
11025  063444  042510  042101  051105
11026  063452  042440  051122  020040
11027  063460  053440  051117  020104
11028  063466  020060  041450  046131
11029  063474  024443     000
11030  063477     106  051117  040515  EM84:   .ASCIZ  /FORMAT IN RKMR3 NOT SET/
11031  063504  020124  047111  051040
11032  063512  046513  031522  047040
11033  063520  052117  051440  052105
11034  063526     000
11035  063527     111  046114  040440  EM85:   .ASCIZ   ILL ADDR IN RKMR3 NOT =0/
11036  063534  042104  020122  047111
11037  063542  051040  046513  031522
11038  063550  047040  052117  036440
11039  063556  000060
11040  063560  044127  046111  020105  EM86:   .ASCIZ  /WHILE WAITING FOR CONTR RDY OR AFTER CONTR RDY REC'D/
11041  063566  040527  052111  047111
11042  063574  020107  047506  020122
11043  063602  047503  052116  020122
11044  063610  042122  020131  051117
11045  063616  040440  052106  051105
11046  063624  041440  047117  051124
11047  063632  051040  054504  051040
11048  063640  041505  042047     000
11049  063645     103  047101  047516  EM87:   .ASCIZ  /CANNOT READ BSE INFO/
11050  063652  020124  042522  042101
11051  063660  041040  042523  044440
11052  063666  042116  000117
11053  063672  047516  042040  044522  EM88:   .ASCII  /NO DRIVES FOUND ON BUS/<CR><LF>
11054  063700  042526  020123  047506
11055  063706  047125  020104  047117
11056  063714  041040  051525  005015
11057  063722  042523  052524  020120          .ASCIZ  /SETUP CORRECTLY & PRESS 'CONT'/<CR><LF>
11058  063730  047503  051122  041505
11059  063736  046124  020131  020046
11060  063744  051120  051505  020123
11061  063752  041447  047117  023524
11062  063760  005015     000
11063  063763     116  020117  051104  EM89:   .ASCII  /NO DRIVES FOUND IN DEVICE MAP ($DEVM)/<CR><LF>
11064  063770  053111  051505  043040
11065  063776  052517  042116  044440
11066  064004  020116  042504  044526
11067  064012  042503  046440  050101
11068  064020  024040  042044  053105
11069  064026  024515  005015
11070  064032  042523  052524  020120          .ASCIZ  /SETUP CORRECTLY & RESTART/<CR><LF>
11071  064040  047503  051122  041505
11072  064046  046124  020131  020046
11073  064054  042522  052123  051101
11074  064062  006524  000012
11075
11076                                  .SBTTL  DATA HEADERS
11077
11078  064066  042524  052123  047040  DH1:    .ASCIZ  /TEST NO.  PC/
11079  064074  027117  020040  041520
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11080  064102     000
11081  064103     122  046513  031122  DH2:    .ASCIZ  /RKMR2  RKMR3   RKER    RKDS    RKCS1   RKCS2   RKASOF/
11082  064110  051011  046513  031522
11083  064116  051011  042513  004522
11084  064124  045522  051504  051011
11085  064132  041513  030523  051011
11086  064140  041513  031123  051011
11087  064146  040513  047523  000106
11088  064154  045522  051115  004462  DH5:    .ASCIZ  /RKMR2  RKMP3   RKER    RKDS    RKDC    RKCS1   RKCS2/
11089  064162  045522  051115  004463
11090  064170  045522  051105  051011
11091  064176  042113  004523  045522
11092  064204  041504  051011  041513
11093  064212  030523  051011  041513
11094  064220  031123     000
11095  064223     122  046513  031122  DH6:    .ASCIZ  /RKMR2   RKMR3   RKDC   FROM CYL  TO CYL  CYL DIFF/
11096  064230  020040  051040  046513
11097  064236  031522  020040  051040
11098  064244  042113  020103  020040
11099  064252  051106  046517  041440
11100  064260  046131  020040  047524
11101  064266  041440  046131  020040
11102  064274  054503  020114  044504
11103  064302  043106     000
11104  064305     122  046513  031122  DH7:    .ASCIZ  /RKMR2  RKMR3   RKER    RKDS    RKDA    RKCS1   RKCS2/
11105  064312  051011  046513  031522
11106  064320  051011  042513  004522
11107  064326  045522  051504  051011
11108  064334  042113  004501  045522
11109  064342  051503  004461  045522
11110  064350  051503  000062
11111  064354  C-4127  047105  042040  DH8:    .ASCIZ  /WHEN DRIVE UNLOADED/
11112  064362  044522  042526  052440
11113  064370  046116  040517  042504
11114  064376  000104
11115  064400  043101  042524  020122  DH9:    .ASCIZ  /AFTER START SPIN CMD REC'D BY DRIVE/
11116  064406  052123  051101  020124
11117  064414  050123  047111  041440
11118  064422  042115  051040  041505
11119  064430  042047  041040  020131
11120  064436  051104  053111  000105
11121  064444  052101  042440  042116  DH10:   .ASCIZ  /AT END OF HEAD LOADING/
11122  064452  047440  020106  042510
11123  064460  042101  046040  040517
11124  064466  044504  043516     000
11125  064473     101  052106  051105  DH11:   .ASCIZ  /AFTER START SPIN CMD & FWD SET/
11126  064500  051440  040524  052122
11127  064506  051440  044520  020116
11128  064514  046503  020104  020046
11129  064522  053506  020104  042523
11130  064530  000124
11131  064532  052101  044440  047116  DH12:   .ASCIZ  /AT INNER LIM FROM START SPIN CMD/
11132  064540  051105  046040  046511
11133  064546  043040  047522  020115
11134  064554  052123  051101  020124
11135  064562  052123  047111  041440
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11136  064570  042115  000
11137  064573  106  047522  020115  DH13:   .ASCIZ  /FROM OUTER LIM TO CYL 0 DURING LOADING/
11138  064600  052517  042524  020122
11139  064606  044514  020115  047524
11140  064614  041440  046131  030040
11141  064622  042040  051125  047111
11142  064630  020107  047514  042101
11143  064636  047111  000107
11144  064642  043101  042524  020122  DH14:   .ASCIZ  /AFTER SEEK WITH BAD PAR/
11145  064650  042523  045505  053440
11146  064656  052111  020110  040502
11147  064664  020104  040520  000122
11148  064672  043101  042524  020122  DH16:   .ASCIZ  /AFTER LOADING HEAD REG & SEEK CMD/
11149  064700  047514  042101  047111
11150  064706  020107  042510  042101
11151  064714  051040  043505  023040
11152  064722  051440  042505  020113
11153  064730  046503  000104
11154  064734  043101  042524  020122  DH17:   .ASCIZ  /AFTER RECAL CMD/
11155  064742  042522  040503  020114
11156  064750  046503  000104
11157  064754  043101  042524  020122  DH18:   .ASCIZ  /AFTER UNLOAD CMD/
11158  064762  047125  047514  042101
11159  064770  041440  042115  000
11160  064775  101  052106  051105  DH19:   .ASCIZ  /AFTER PACK CMD/
11161  065002  050040  041501  020113
11162  065010  046503  000104
11163  065014  043101  042524  020122  DH20:   .ASCIZ  /AFTER SELECT DRIVE CMD/
11164  065022  042523  042514  052103
11165  065030  042040  044522  042526
11166  065036  041440  042115  000
11167  065043  101  052106  051105  DH21:   .ASCIZ  /AFTER SUBSYSTEM CLEAR/
11168  065050  051440  041125  054523
11169  065056  052123  046505  041440
11170  065064  042514  051101  000
11171  065071  101  052106  051105  DH22:   .ASCIZ  /AFTER DRIVE CLEAR CMD/
11172  065076  042040  044522  042526
11173  065104  041440  042514  051101
11174  065112  041440  042115  000
11175  065117  124  051505  020124  DH23:   .ASCIZ  /TEST NO.       TRAP PC/
11176  065124  047516  004456  051124
11177  065132  050101  050040  000103
11178  065140  043101  042524  020122  DH25:   .ASCIZ  /AFTER SEEK CMD/
11179  065146  042523  045505  041440
11180  065154  042115  000
11181  065157  101  052106  051105  DH26:   .ASCIZ  /AFTER READ DATA CMD/
11182  065164  051040  040505  020104
11183  065172  040504  040524  041440
11184  065200  042115  000
11185  065203  105  050130  041505  DH28:   .ASCIZ  /EXPECT EXPECT  EXPECT  EXPECT  EXPECT  EXPECT  EXPECT/
11186  065210  004524  054105  042520
11187  065216  052103  042411  050130
11188  065224  041505  004524  054105
11189  065232  042520  052103  042411
11190  065240  050130  041505  004524
11191  065246  054105  042520  052103
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11192  065254  042411  050130  041505
11193  065262  000124
11194  065264  041501  052524  046101  DH29:   .ASCIZ  ACTUAL ACTUAL  ACTUAL  ACTUAL  ACTUAL  ACTUAL  ACTUAL
11195  065272  040411  052103  040525
11196  065300  004514  041501  052524
11197  065306  046101  040411  052103
11198  065314  040525  004514  041501
11199  065322  052524  046101  040411
11200  065330  052103  040525  004514
11201  065336  041501  052524  046101
11202  065344     000
11203  065345     101  052106  051105  DH30:   .ASCIZ  /AFTER READ HEADER CMD
11204  065352  051040  040505  020104
11205  065360  042510  042101  051105
11206  065366  041440  042115     000
11207  065373     122  046513  031122  DH31:   .ASCIZ  RKMR2  RKMR3  RKCS1  RKCS2  RKDC  RKDA
11208  065400  051011  046513  031522
11209  065406  051011  041513  030523
11210  065414  051011  041513  031123
11211  065422  051011  042113  004503
11212  065430  045522  040504     000
11213  065435     101  004460  030102  DH32:   .ASCIZ  /A0     B0     A1     B1     A2     B2     B3/
11214  065442  040411  004461  030502
11215  065450  040411  004462  031102
11216  065456  041011  000063
11217  065462  052504  044522  043516  DH33:   .ASCIZ  /DURING SEEK CMD/
11218  065470  051440  042505  020113
11219  065476  046503  000104
11220  065502  042523  052103  051117  DH34:   .ASCIZ   SECTOR REG UNSTABLE/
11221  065510  051040  043505  052440
11222  065516  051516  040524  046102
11223  065524  000105
11224  065526  042502  053524  042505  DH35:   .ASCIZ   BETWEEN SECTOR COUNTS/
11225  065534  020116  042523  052103
11226  065542  051117  041440  052517
11227  065550  052116  000123
11228  065554  045522  051115  020062  DH36:   .ASCIZ  /RKMR2   RKMR3   RKCS1   RKCS2  FROM SECT  TO SECT/
11229  065562  020040  045522  051115
11230  065570  020063  020040  045522
11231  065576  051503  020061  020040
11232  065604  045522  051503  020062
11233  065612  043040  047522  020115
11234  065620  042523  052103  020040
11235  065626  047524  051440  041505
11236  065634  000124
11237  065636  050123  042505  020104  DH37:   .ASCIZ  /SPEED OK NOT =0 10 SEC AFTER UNLOAD/
11238  065644  045517  047040  052117
11239  065652  036440  020060  030061
11240  065660  051440  041505  040440
11241  065666  052106  051105  052440
11242  065674  046116  040517  000104
11243  065702  043101  042524  020122  DH38:   .ASCIZ  /AFTER LIM DET/
11244  065710  044514  020115  042504
11245  065716  000124
11246  065720  043101  042524  020122  DH39:   .ASCIZ  /AFTER WRITE HEADER CMD
11247  065726  051127  052111  020105
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11248  065734  042510  042101  051105
11249  065742  041440  042115     000
11250  065747     122  046513  031122  DH40:   .ASCIZ  /RkMR2  RKMR3   RKDA    WORD#   HEADER WAS  SHOULD BE/
11251  065754  051011  046513  031522
11252  065762  051011  042113  004501
11253  065770  047527  042122  004443
11254  065776  042510  042101  051105
11255  066004  053440  051501  020040
11256  066012  044123  052517  042114
11257  066020  041040  000105
11258  066024  052504  044522  043516  DH41:   .ASCIZ  /DURING RECAL CMD/
11259  066032  051040  041505  046101
11260  066040  041440  042115     000
11261  066045     117  020116  042523  DH42:   .ASCIZ  /ON SEC 0,2,4,6,8  CYL 410 TRK 2/
11262  066052  020103  026060  026062
11263  066060  026064  026066  020070
11264  066066  041440  046131  032040
11265  066074  030061  052040  045522
11266  066102  031040     000
11267  066105     106  051117  040515  DH44:   .ASCIZ   FORMAT & ALL R-W TESTS WILL BE BYPASSED/
11268  066112  020124  020046  046101
11269  066120  020114  026522  020127
11270  066126  042524  052123  020123
11271  066134  044527  046114  041040
11272  066142  020105  054502  040520
11273  066150  051523  042105     000
11274  066155     102  041505  052501  DH45:   .ASCIZ  /BECAUSE OF LIM DET ERR ON PREV TEST/
11275  066162  042523  047440  020106
11276  066170  044514  020115  042504
11277  066176  020124  051105  020122
11278  066204  047117  050040  042522
11279  066212  020126  042524  052123
11280  066220     000
11281  066221     103  052517  042114  DH46:   .ASCIZ  /COULD NOT READ BSE INFO ON PREV TEST/
11282  066226  047040  052117  051040
11283  066234  040505  020104  051502
11284  066242  020105  047111  047506
11285  066250  047440  020116  051120
11286  066256  052105  052040  051505
11287  066264  000124
11288  066266  045522  051503  004461  DH47:   .ASCIZ  /RKCS1  RKCS2   RKASOF  RKER    RKDS    RKDC/
11289  066274  045522  051503  004462
11290  066302  045522  051501  043117
11291  066310  051011  042513  004522
11292  066316  045522  051504  051011
11293  066324  042113  000103
11294  066330  043101  042524  020122  DH48:   .ASCIZ  /AFTER SEEK CMD TO INV CYL/
11295  066336  042523  045505  041440
11296  066344  042115  052040  020117
11297  066352  047111  020126  054503
11298  066360  000114
11299  066362  051515  020107  023101  DH49:   .ASCIZ  /MSG A&B IN RKMR2 & RKMR3 RESP., ARE INVALID/
11300  066370  020102  047111  051040
11301  066376  046513  031122  023040
11302  066404  051040  046513  031522
11303  066412  051040  051505  027120
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11304  066420  020054  051101  020105
11305  066426  047111  040526  044514
11306  066434  000104
11307  066436  043101  042524  020122  DH51:   .ASCIZ  /AFTER SEEK TO SELF CMD/
11308  066444  042523  045505  052040
11309  066452  020117  042523  043114
11310  066460  041440  042115     000
11311  066465     122  046513  031122  DH52:   .ASCIZ  /RKMR2  RKMR3   RKDA    EXP CYL#        CYL HEADER WAS/
11312  066472  051011  046513  031522
11313  066500  051011  042113  004501
11314  066506  054105  020120  054503
11315  066514  021514  041411  046131
11316  066522  044040  040505  042504
11317  066530  020122  040527  000123
11318  066536  047117  051440  041505  DH53:   .ASCIZ  /ON SEC 10,12,14,16,18,20 CYL 410 TRK 2/
11319  066544  030440  026060  031061
11320  066552  030454  026064  033061
11321  066560  030454  026070  030062
11322  066566  041440  046131  032040
11323  066574  030061  052040  045522
11324  066602  031040     000
11325                          .SBTTL  ERR OUTPUT DATA
11326
11327          066606          .EVEN
11328  066606  001214  001116  003362  DT1:    $TESTN,$ERRPC,HMR2,HMR3,HER,HDS,HCS1,HCS2,HASOF
11329  066614  003364  003350  003346
11330  066622  003334  003336  003352
11331  066630  001214  001116  003362  DT3:    $TESTN,$ERRPC,HMR2,HMR3,HER,HDS,HDC,HCS1,HCS2
11332  066636  003364  003350  003346
11333  066644  003354  003334  003336
11334  066652  001214  001116  003362  DT4:    $TESTN,$ERRPC,HMR2,HMR3,HDC,FRCYL,TOCYL,CALDIF
11335  066660  003364  003354  001350
11336  066666  001352  001360
11337  066672  001214  001116  003362  DT5:    $TESTN,$ERRPC,HMR2,HMR3,HER,HDS,HDA,HCS1,HCS2
11338  066700  003364  003350  003346
11339  066706  003344  003334  003336
11340  066714  001214  001116  003362  DT6:    $TESTN,$ERRPC,HMR2,HMR3,HCS1,HCS2,PSEC,ESEC
11341  066722  003364  003334  003336
11342  066730  001402  001404
11343  066734  001214  001116  003362  DT7:    $TESTN,$ERRPC,HMR2,HMR3,HDA,WDCNT,HDWD,TEMP1
11344  066742  003364  003344  001442
11345  066750  001454  003372
11346  066754  001214  001116  003362  DT8:    $TESTN,$ERRPC,HMR2,HMR3,HDC,TOCYL,FRCYL,CALDIF
11347  066762  003364  003354  001352
11348  066770  001350  001360
11349  066774  001214  001116  003362  DT9:    $TESTN,$ERRPC,HMR2,HMR3,HDA,TOCYL,RHTAB
11350  067002  003364  003344  001352
11351  067010  001674
11352  067012  001214  001116  003362  DT10:   $TESTN,$ERRPC,HMR2,HMR3,HDA,FRCYL,RHTAB
11353  067020  003364  003344  001350
11354  067026  001674
11355  067030  001214  001334          DT11:   $TESTN,TRAPPC
11356  067034  001214  001116  003362  DT12:   $TESTN,$ERRPC,HMR2,HMR3,HCS1,HCS2,HDC,HDA
11357  067042  003364  003334  003336
11358  067050  003354  003344
11359  067054  001214  001116  003424  DT13:   $TESTN,$ERRPC,E.A0,E.B0,E.A1,E.B1,H.A0,H.B0,H.A1,H.B1
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 11360  067062  003426  003430  003432
 11361  067070  003424  003406  003410
 11362  067076  003412
 11363  067100  003334  003336  003352          HCS1,HCS2,HASOF,HER,HDS,HDC
 11364  067106  003350  003346  003354
 11365
 11366  067114  001214  001116  003424  DT14:   STESTN,SERRPC,E.A0,E.B0,E.A1,E.B1,E.A2,E.B2
 11367  067122  003426  003430  003432
 11368  067130  003434  003436
 11369  067134  003404  003406  003410          H.A0,H.B0,H.A1,H.B1,H.A2,H.B2
 11370  067142  003412  003414  003416
 11371  067150  003334  003336  003352          HCS1,HCS2,HASOF,HER,HDS,HDC
 11372  067156  003350  003346  003354
 11373
 11374  067164  001214  001116  003424  DT15:   STESTN,SERRPC,E.A0,E.B0,E.A1,E.B1,E.A2,E.B2,E.B3
 11375  067172  003426  003430  003432
 11376  067200  003434  003436  003442
 11377  067206  003404  003406  003410          H.A0,H.B0,H.A1,H.B1,H.A2,H.B2,H.B3
 11378  067214  003412  003414  003416
 11379  067222  003422
 11380  067224  003334  003336  003352          HCS1,HCS2,HASOF,HER,HDS,HDC
 11381  067232  003350  003346  003354
 11382
 11383                                  .SETTL  ERR DATA FORMATS
 11384
 11385  067240  000002                  DF1:    2
 11386  067242     002     000                  .BYTE 2,0
 11387  067244  064103                          DH2
 11388  067246     007     000                  .BYTE 7,0
 11389
 11390  067250  000004                  DF2:    4
 11391  067252     000     000                  .BYTE 0,0
 11392  067254  066362                          DH49
 11393  067256     000     000                  .BYTE 0,0
 11394  067260  064066                          DH1
 11395  067262     002     000                  .BYTE 2,0
 11396  067264  064103                          DH2
 11397  067266     007     000                  .BYTE 7,0
 11398
 11399  067270  000001                  DF3:    1
 11400  067272     002     000                  .BYTE   2,0
 11401  067274  000002                  DF4:    2
 11402  067276     002     000                  .BYTE   2,0
 11403  067300  065373                          DH31
 11404  067302     006     000                  .BYTE   6,0
 11405
 11406  067304  000003                  DF5:    3
 11407  067306     000     000                  .BYTE 0,0
 11408  067310  064066                          DH1
 11409  067312     002     000                  .BYTE 2,0
 11410  067314  064154                          DH5
 11411  067316     007     000                  .BYTE 7,0
 11412
 11413  067320  000003                  DF6:    3
 11414  067322     000     000                  .BYTE 0,0
 11415  067324  064066                          DH1
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11416  067326  000002  000          .BYTE 2,0
11417  067330  064223               DH6
11418  067332  000006  000          .BYTE 6,0
11419
11420
11421
11422  067334  000003               DF10:  3
11423  067336  000000  000          .BYTE 0,0
11424  067340  064066               DH1
11425  067342  000002  000          .BYTE 2,0
11426  067344  064103               DH2
11427  067346  000007  000          .BYTE 7,0
11428
11429  067350  000003               DF12:  3
11430  067352  000000  000          .BYTE 0,0
11431  067354  064066               DH1
11432  067356  000002  000          .BYTE 2,0
11433  067360  065554               DH36
11434  067362  000006  000          .BYTE 6,0
11435  067364  000003               DF13:  3
11436  067366  000000  000          .BYTE  0,0
11437  067370  064066               DH1
11438  067372  000002  000          .BYTE  2,0
11439  067374  064305               DH7
11440  067376  000007  000          .BYTE  7,0
11441
11442  067400  000002               DF14:  2
11443  067402  000002  000          .BYTE  2,0
11444  067404  065747               DH40
11445  067406  000006  000          .BYTE  6,0
11446
11447
11448  067410  000003               DF15:  3
11449  067412  000000  000          .BYTE  0,0
11450  067414  064066               DH1
11451  067416  000002  000          .BYTE  2,0
11452  067420  064305               DH7
11453  067422  000007  000          .BYTE  7,0
11454
11455  067424  000002               DF16:  2
11456  067426  000000  000          .BYTE 0,0
11457  067430  064066               DH1
11458  067432  000002  000          .BYTE 2,0
11459
11460  067434  000004               DF17:  4
11461  067436  000000  000          .BYTE  0,0
11462  067440  066105               DH44
11463  067442  000000  000          .BYTE  0,0
11464  067444  064066               DH1
11465  067446  000002  000          .BYTE  2,0
11466  067450  064103               DH2
11467  067452  000007  000          .BYTE  7,0
11468  067454  000007               DF20:  7
11469  067456  000000  000          .BYTE  0,0
11470  067460  064066               DH1
11471  067462  000002  000          .BYTE  2,0
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 11472  067464  065203                          DH28
 11473  067466     000      000                 .BYTE   0,0
 11474  067470  065435                          DH32
 11475  067472     024      000                 .BYTE   4,0
 11476  067474  065264                          DH29
 11477  067476     000      000                 .BYTE   0,0
 11478  067500  065435                          DH32
 11479  067502     004      000                 .BYTE   4,0
 11480  067504  066266                          DH47
 11481  067506     006      000                 .BYTE   6,0
 11482  067510  000002                DF21:     2
 11483  067512     002      000                 .BYTE   2,0
 11484  067514  066465                          DH52
 11485  067516     005      000                 .BYTE   5,0
 11486  067520  000007                DF22:     7
 11487  067522     000      000                 .BYTE   0,0
 11488  067524  064066                          DH1
 11489  067526     002      000                 .BYTE   2,0
 11490  067530  065203                          DH28
 11491  067532     000      000                 .BYTE   0,0
 11492  067534  065435                          DH32
 11493  067536     006      000                 .BYTE   6,0
 11494  067540  065264                          DH29
 11495  067542     000      000                 .BYTE   0,0
 11496  067544  065435                          DH32
 11497  067546     006      000                 .BYTE   6,0
 11498  067550  066266                          DH47
 11499  067552     006      000                 .BYTE   6,0
 11500
 11501  067554  000007                DF23:     7
 11502  067556     000      000                 .BYTE   0,0
 11503  067560  064066                          DH1
 11504  067562     002      000                 .BYTE   2,0
 11505  067564  065203                          DH28
 11506  067566     000      000                 .BYTE   0,0
 11507  067570  065435                          DH32
 11508  067572     007      000                 .BYTE   7,0
 11509  067574  065264                          DH29
 11510  067576     000      000                 .BYTE   0,0
 11511  067600  065435                          DH32
 11512  067602     007      000                 .BYTE   7,0
 11513  067604  066266                          DH47
 11514  067606     006      000                 .BYTE   6,0
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                                ;;*****************************************************************
                                .SBTTL  TYPE ERR ROUTINE
                                ;*ENTRY JSR PC,TYP ERR
                                ;*RETURN RTS PC
                                ;*
                                ;*THIS ROUTINE USES THE "ITEM CONTROL BYTE" ($ITEMB) TO DETERMINE WHICH
                                ;*ERR IS TO BE REPORTED. IT THEN USES THE "ERR TABLE" ($ERRTB)
                                ;*ENTRY TO DEFINE WHAT INFORMATION IS TO BE REPORTED CONCERNING
                                ;*THE ERR.
                                ;;*****************************************************************
011525  067610  104413       TYPERR: SAVREG
011526  067612  113700  001114        MOVB    $ITEMB,R0       ;ENTER ERR NUMBER
011527  067616  042700  177400        BIC     #177400,R0      ;CLEAR SIGN EXTENSION
011530  067622  005300                DEC     R0              ;FORM INDEX FOR ERR TABLE
011531  067624  006300                ASL     R0
011532  067626  006300                ASL     R0
011533  067630  006300                ASL     R0
011534  067632  062700  003506  1$:   ADD     #$ERRTB,R0      ;FORM ADDRESS OF ERR ENTRY
011535  067636  012037  067652        MOV     (R0)+,2$        ;GET EM POINTER
011536  067642  001404                BEQ     3$              ;BRANCH IF THERE ISN'T ONE
011537  067644  104401  001205        TYPE    .$CRLF          ;TYPE CARRIAGE RETURN LINE FEED
011540  067650  104401                TYPE                    ;TYPE ERR MSG (EM)
011541  067652  000000        2$:     .WORD   0               ;EM POINTER GOES HERE
011542  067654  012037  067670  3$:   MOV     (R0)+,4$        ;GET DH POINTER
011543  067660  001404                BEQ     5$              ;BRANCH IF THERE ISN'T ONE
011544  067662  104401  001205        TYPE    .$CRLF          ;TYPE CR-LF
011545  067666  104401                TYPE                    ;TYPE DATA HEADER
011546  067670  000000        4$:     .WORD   0               ;DH POINTER GOES HERE
011547  067672  012001        5$:     MOV     (R0)+,R1        ;GET DT POINTER
011550  067674  001455                BEQ     20$             ;BRANCH IF THERE ARE NONE
011551  067676  005004                CLR     R4              ;SET INDENT SWITCH
011552  067700  012000                MOV     (R0)+,R0        ;GET DF POINTER
011553  067702  012002                MOV     (R0)+,R2        ;STORE NUMBER OF DH'S
011554  067704  001446                BEQ     17$             ;DH NUM IS 0-BRANCH
011555  067706  005104                COM     R4              ;NO INDENT
```

```
11550  067710  104401  001205          TYPE    ,$CRLF
11551  067714  112003                  10$:    MOVB    (R0)+,R3        ;GET & STORE NUMBER OF DATA WORDS
11552  067716  105720                          TSTB    (R0)+           ;BUMP PAST FORMAT WORD
11553  067720  005703                          TST     R3              ;TEST IF ANY DATA FOR THIS HEADER
11554  067722  001407                          BEQ     14$             ;NO - SKIP DATA PRINT
11555  067724  013146                  11$:    MOV     @(R1)+,-(SP)    ;PUT FIRST DATA WORD ON STACK
11556  067726  104402                          TYPOC                   ;TYPE IT
11557  067730  005303                          DEC     R3              ;MORE DATA WORDS
11558  067732  001403                          BEQ     14$             ;NO-BRANCH
11559  067734  104401  070064                  TYPE    ,SPACE2         ;TYPE SEPARATORS
11560  067740  000771                          BR      11$             ;LOOP
11561  067742  005302                  14$:    DEC     R2              ;MORE DH'S?
11562  067744  003431                          BLE     20$             ;NO-BRANCH
11563  067746  104401  001205                  TYPE    ,$CRLF
11564  067752  005760  000002                  TST     2(R0)           ;ONLY A DH IN THIS REQUEST?
11565  067756  001404                          BEQ     15$             ;YES-BRANCH BYPASS INDENT
11566  067760  005104                          COM     R4              ;INDENT?
11567  067762  001002                          BNE     15$             ;NO-BRANCH
11568  067764  104401  070064                  TYPE    ,SPACE2         ;YES-TYPE SPACES
11569  067770  012037  067776          15$:    MOV     (R0)+,16$       ;GET NEXT DH POINTER
11570  067774  104401                          TYPE                    ;TYPE DH
11571  067776  000000                  16$:    .WORD   0               ;DH POINTER GOES HERE
11572  070000  105710                          TSTB    (R0)            ;TYPE A DT?
11573  070002  001003                          BNE     21$             ;YES-BRANCH
11574  070004  062700  000002                  ADD     #2,R0           ;INCREMENT DF POINTER
11575  070010  000754                          BR      14$             ;SEE IF END OF DF BLOCK
11576  070012  104401  001205          21$:    TYPE    ,$CRLF
11577  070016  005704                          TST     R4              ;INDENT?
11578  070020  001335                          BNE     10$             ;NO-BRANCH
11579  070022  104401  070064          17$:    TYPE    ,SPACE2         ;YES-TYPE SPACES
11580  070026  000732                          BR      10$             ;LOOP
11581  070030  104414                  20$:    RESREG
11582
11583  070032  032777  010000  111100          BIT     #SW12,@SWR      ;ABORT DRV AFTER 20 ERRS?
11584  070040  001410                          BEQ     25$             ;BR IF NO
11585  070042  023727  001103  000024          CMP     $ERFLG,#20.     ;ELSE SEE IF 20 ERRS
11586  070050  001004                          BNE     25$             ;BR IF NO
11587  070052  012706  001100                  MOV     #STACK,SP       ;ELSE RESTORE STK
11588  070056  000137  043470                  JMP     $EOP            ;AND DROP DRIVE
11589  070062  000207                  25$:    RTS     PC
11590  070064  023040     000          SPACE2: .ASCIZ  /  /            ;2 SPACES
```

```
 1159:          000000:                        .END
```

```
ABASE = 177440          1719    1760    1774#
ACDW1 = 000000          1719    1762
ACDW2 = 000000          1719    1763
ACLO  = 000010          1380#
ACPUOP= 000000          1719    1734
ACT11   003450          1945#   3237*
ACDW0 = 000000          1719    1764
ACDW1 = 000000          1719    1765
ADDW10= 000000          1719
ADDW11= 000000          1719
ADDW12= 000000          1719
ADDW13= 000000          1719
ADDW14= 000000          1719
ADDW15= 000000          1719
ADDW2 = 000000          1719    1766
ADDW3 = 000000          1719    1767
ADDW4 = 000000          1719    1768
ADDW5 = 000000          1719    1769
ADDW6 = 000000          1719    1770
ADDW7 = 000000          1719    1771
ADDW8 = 000000          1719
ADDW9 = 000000          1719
ADEVCT= 000000          1719    1725
ADEVM = 000000          1719    1761
AENV  = 000000          1719    1730
AENVM = 000000          1719    1731
AFATAL= 000000          1719    1722
AMADR1= 000000          1719    1747
AMADR2= 000000          1719    1751
AMADR3= 000000          1719    1754
AMADR4  000000          1719    1757
AMAMS1= 000000          1719    1741
AMAMS2= 000000          1719    1749
AMAMS3= 000000          1719    1752
AMAMS4= 000000          1719    1755
AMSGAC= 000000          1719    1727
AMSGLG= 000000          1719    1728
AMSGTY= 000000          1719    1721
AMTYP1= 000000          1719    1742
AMTYP2= 000000          1719    1750
AMTYP3= 000000          1719    1753
AMTYP4= 000000          1719    1756
APASS = 000000          1719    1724
APRIOR= 000000          1719
APTCSU= 000040          9615    9787#
APTENV= 000001          9562    9608    9743    9785#
APTSIZ= 000200          3166    9784#
APTSPC= 000100          9610    9745    9786#
ASWREG= 000000          1719    1732
ATESTN= 000000          1719    1723
ATTN    003324          1877#   4689    8608    8627    8653
AUNIT = 000000          1719    1726
AUSWR = 000000          1719    1733
AVECT1= 000000          1719    1758
AVECT2= 000000          1719    1759
BADHDR  003320          1868#   3245*   5166*   6852*   9335
```

```
BADTMO  050426          3317    9390#
BAI     = 000020        1343#   5175    5324
BA16    = 000400        1329#
BA17    = 001000        1330#
BIT0    = 000001        1272#   1326    1358    1377    1935    3354    9259
BIT00   = 000001        1262#   1272
BIT01   = 000002        1261#   1271
BIT02   = 000004        1260#   1270
BIT03   = 000010        1259#   1269
BIT04   = 000020        1258#   1268
BIT05   = 000040        1257#   1267
BIT06   = 000100        1256#   1266
BIT07   = 000200        1255#   1265
BIT08   = 000400        1254#   1264    9497
BIT09   = 001000        1253#   1263    9505    9573
BIT1    = 000002        1271#   1359    1936
BIT10   = 002000        1252#   1331    1349    1368    1400    1414    1428    1441    1455    4665    9550
BIT11   = 004000        1251#   1332    1350    1369    1386    1401    1415    1429    1442    1456    4667    9512
BIT12   = 010000        1250#   1333    1351    1370    1402    1416    1430    1443    1457
BIT13   = 020000        1249#   1334    1352    1371    1387    1403    1417    1431    1444    1458    9557
BIT14   = 040000        1248#   1335    1353    1372    1388    1404    1418    1432    1445    1459    1472    9096    9128
                        9483
BIT15   = 100000        1247#   1336    1337    1354    1373    1389    1405    1475    4184    9096    9124
BIT2    = 000004        1270#   1360    1379    1937
BIT3    = 000010        1269#   1342    1361    1380
BIT4    = 000020        1268#   1343    1362    1381    1394    1422    1449    6055
BIT5    = 000040        1267#   1344    1363    1382    1395    1409    1423    1436    1450
BIT6    = 000100        1266#   1327    1345    1364    1383    1396    1410    1424    1437    1451
BIT7    = 000200        1265#   1328    1346    1365    1384    1397    1411    1425    1438    1452    3344
BIT8    = 000400        1264#   1329    1347    1366    1385    1398    1412    1426    1439    1453
BIT9    = 001000        1263#   1330    1348    1367    1399    1413    1427    1440    1454    4661
BPTVEC= 000014          1279#
BSE     = 000200        1365#
BSERR   001456          1842#   6336*   6342*   6630
BSE22H  002304          1856#   6287    6339    6359    9122
BSE22S  054752          6349    9126    10411#
BYP     044704          3424    3447    3451    3466    3518    3526    3544    3548    3552    3556    8680#
BYPCER  001462          1845#   3342*   3568*   4268*   4300*   4881*   4979*   6384*   6482*   9338*   8796
BYPFMT  001464          1846#   5456*   5548*   5783*   5875*   9094
BYPT16  001340          1790#   3079*   3084*   3089*   3094*   3099*   3103*   4321
BYT16   007026          1489    3083#
BYT16A  007046          1493    3088#
CALADD  001366          1803#   5462*   5789*   6642*   6673*   6695    6781    6799    6837    6844*   6855*   9090    9100
                        9102    9150
CALDIF  001360          1800#   4423*   4439    4471*   4502    5580*   5900*   6098*   6677*   7241*   7584*   7942*   8306*
                        11334   11346
CCLR    = 100000        1337#   3641    3948    3977    4005    4018    4107    4135    4194    4235    4340    4381    4431
                        4445    4479    4508    4560    4601    4704    4711    4728    4793    4904    4937    5016    5636
                        5906    5960    6160    6407    6440    6519    6755    7070    7291    7419    7634    7762    7992
                        8120    8349    8356    8373    8837    8847    8857    8867    9339    9357
CCYL    001354          1798#   4330*   4417*   4418    4424    4465*   4466    4472    7370*   7713*   8071*
CDT     = 002000        1331#   3839
CERR    = 100000        1336#   3404    3504    3802    3852    3899    4768    5103    5191    5244    5334    5380    5474
                        5511    5611    5683    5726    5801    5838    5932    5996    6039    6135    6220    6299    6567
                        6659    6730    6807    6871    6933    6947    7045    7117    7168    7266    7337    7394    7465
                        7514    7609    7680    7737    7808    7857    7920    7967    8038    8095    8166    8215    8289
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                    8798    9893
CFMT   = 010000     1333#   5329    5341    5376    5399
CHKFLG  001466      1850#   8690*   8772    8776    8780
CHKMSG  044720      3686    3939    3962    3996    4029    4056    4083    4220    4254    4285    4366    4400    4586
                    4620    4670    4781    4812    4897    4923    4970    5001    5035    5130    5206    5271    5359
                    5417    5489    5593    5624    5655    5742    5816    5918    5945    5979    6057    6119    6148
                    6179    6311    6400    6426    6473    6504    6538    6709    6743    6774    6822    7029    7058
                    7089    7254    7279    7310    7381    7407    7438    7597    7622    7653    7724    7750    7781
                    7955    7980    8011    8082    8108    8139    8334    8690#
CKTERR  045452      8558    8562    8574    8579    8796#
CLEAR = 104407      9482    9546    9572    10400#
CLEAR = 000005      1314#   3979    4237    4383    4447    4510    4603    4713    4795    4906    5018    5638    5962
                    6162    6409    6521    6757    7072    7293    7421    7636    7764    7994    8122    8358    9359
CLKOF   047710      4017    4047    4074    4100    4156    4161    9230#
CLKON   047614      4008    4038    4065    4091    9208#
CLOCK   047654      3266    9219#
CLRFLG  043640      3187    8435#
COE    = 001000     1367#
COUNT   001372      1807#   4006*   4036*   4063*   4089*   9220*   9222*
CR     = 000015     1187#   9654    9664    10414   10419   10421   10426   10430   10440   10449   10456   10464   10469
                    10474   10479   10485   10492   10500   10505   10510   10514   10518   10521   10526   10531   10535
                    10539   10545   10550   10553   10558   10562   10564   10567   10570   10575   10579   10589   10597
                    10606   10612   10616   10619   10622   10629   10647   10851   10921   11053   11057   11063   11070
CRLF   = 000200     1188#   9625    9664
CTO    = 004000     1332#   8802
CYLADD  001364      1802#   3696    3972    4230    4292    4376    4434    4482    4596    4680    4750    4819    5011
                    5141    5217    5282    5427    5662    5663    5748    5955    6063    6186    6514    6781    7096
                    7317    7445    7660    7788    8018    8146    8343    8972*   8973*   8974*   8975*   8976*   8977*
                    8995*   8996*   8997*   8998*   8999*   9000*
CYLDIF  001362      1801#   3693    3969    4227    4296    4373    4439    4491    4497    4502    4593    4677    4787
                    5008    5138    5214    5279    5424    5600    5630    5924    5952    6126    6154    6511    6716
                    6749    7036    7064    7285    7413    7628    7756    7986    8114    8340    8957*   8958*   8959*
                    8960*   8961*   8962*   8963    8965*   8982*   8983*   8984*   8985*   8986*   8987*   8988    8990*
CYLINV  042744      7567    8257#
DATAO   001444      1835#   5184    5295
DATAOI  001446      1836#
DATAI   001450      1837#   5325    5434
DCK    = 100000     1373#
DCLO   = 000020     1381#
DCPAR  = 020000     1334#   3877    3896
DDISP  = 177570     1194#   1694    3154
DDPCH   003446      1944#   3233*   3412    3597
DDT    = 000400     1385#   3825    3846
DDUMP   003444      1943#   3200*   8435
DF1     067240      1985    1991    1997    2003    2008    2014    2020    2026    2094    2100    2111    2116    2121
                    2126    2131    2136    2141    2146    2151    2156    2161    2271    2296    2321    2346    2406
                    2421    2476    2481    2486    2551    11385#
DF10    067334      2032    2038    2043    2048    2053    2089    2106    2216    2266    2381    2386    2391    2396
                    2401    2411    2416    2426    2431    2436    2441    2491    2511    2516    2531    2536    2541
                    2546    2576    2581    2586    2596    2671    2676    2711    2726    2731    2736    2741    2776
                    2786    2791    2812    2817    2882    2978    2983    2988    3003    3008    3018    3023    3028
                    3033    3038    11422#
DF12    067350      2496    11429#
DF13    067364      2631    2636    11435#
DF14    067400      2641    11442#
DF15    067410      2606    2611    2746    11448#
```

DF16	067424	2591	2626	11455#										
DF17	067434	2751	2766	11460#										
DF2	067250	3063	3068	3074	11390#									
DF20	067454	2058	2063	2068	2073	2196	2201	2226	2231	2236	2241	2246	2251	2256
		2261	2276	2281	2286	2291	2301	2306	2311	2316	2326	2331	2336	2341
		2361	2366	2371	2376	2446	2451	2456	2461	2556	2561	2566	2571	2646
		2651	2656	2661	2686	2691	2696	2701	2716	2721	2842	2847	2852	2857
		2897	2902	2907	2912	2917	2922	2927	2932	2937	2942	2947	2952	2957
		2962	3043	3048	11468#									
DF21	067510	2993	2998	11482#										
DF22	067520	2078	2083	2166	2171	2186	2191	2351	2356	2466	2471	2501	2506	2601
		2616	2621	2892	2967	2972	3053	3058	11486#					
DF23	067554	2206	2211	2221	11501#									
DF3	067270	2781	11399#											
DF4	067274	3013	11401#											
DF5	067304	2761	11406#											
DF6	067320	2176	2181	2666	2681	2706	2796	2801	2807	2822	2827	2832	2837	2862
		2867	2887	11413#										
DH1	064066	1983	1989	1995	2001	2006	2012	2018	2024	2092	2098	2109	2114	2119
		2124	2129	2134	2139	2144	2149	2154	2159	2269	2294	2319	2344	2404
		2419	2474	2479	2484	2549	2639	2991	2996	3011	11078#	11394	11408	11415
		11424	11431	11437	11450	11457	11464	11470	11488	11503				
DH10	064444	2244	2249	2254	2259	2264	2614	2619	11121#					
DH11	064473	2274	2279	2284	2289	3026	11125#							
DH12	064532	2299	2304	2309	2314	3031	11131#							
DH13	064573	2324	2329	2334	2339	3036	11137#							
DH14	064642	2164	2169	2174	2179	2349	2354	2399	2414	2439	2504	2794	2799	2885
		11144#												
DH16	064672	2209	2369	2374	3041	3046	3051	3056	11148#					
DH17	064734	2184	2189	2204	2214	2409	2534	2709	2714	2719	2724	2729	2734	2789
		2935	2940	11154#										
DH18	064754	2030	2036	2041	2046	2051	3016	11157#						
DH19	064775	2104	2379	11160#										
DH2	064103	11081#	11387	11396	11426	11466								
DH20	065014	2384	11163#											
DH21	065043	2087	2389	2424	2429	11167#								
DH22	065071	2514	2529	2784	2880	2895	2900	2925	2930	11171#				
DH23	065117	2779	11175#											
DH25	065140	2434	2439	2444	2449	2454	2459	2464	2469	2664	2669	2674	2759	2805
		11178#												
DH26	065157	2194	2199	2359	2364	2739	2744	11181#						
DH28	065203	11185#	11472	11490	11505									
DH29	065264	11194#	11476	11494	11509									
DH30	065345	2594	2599	2604	2609	2890	2915	2920	2955	2960	3006	11203#		
DH31	065373	11207#	11403											
DH32	065435	11213#	11474	11478	11492	11496	11507	11511						
DH33	065462	2644	2649	2654	2659	2679	11217#							
DH34	065502	2489	11220#											
DH35	065526	2494	11224#											
DH36	065554	11228#	11433											
DH37	065636	2509	11237#											
DH38	065702	2554	2559	2564	2569	2574	2579	2584	2976	11243#				
DH39	065720	2629	2634	2905	2910	2945	2950	2965	2970	3001	11246#			
DH40	065747	11250#	11444											
DH41	066024	2684	2689	2694	2699	2704	2810	2986	11258#					
DH42	066045	2764	11261#											

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        066126          2774    11267#  11462
        066156          2589    11274#
        066221          2624    11281#
        066266         11288#   11480   11498   11513
        066330          2815     2820    2825    2830    2835    2840    2845    2850    2855    2860    2865   11294#
        066362         11299#   11392
        064154         11088#   11410
        066436          2539     2544   11307#
        066466         11311#   11484
        066536          2749    11318#
        064223         11095#   11417
        064335         11134#   11439   11452
        064354          2056     2061    2066    2071    2076    2081    2219   11111#
        064400          2224     2229    2234    2239    2394    2981    3021   11115#
=       040000          1335#
DISPLA  001142          1694#    3154*   3162*   9527*   9549*
DISPRE  000174          1484#    3162
DLT     100000          1354#    5114    5255    5391    5521    5694    5848    6007    6958    7128    7348    7476    7691
                        7819     8049    8177
DLY     044666          4020     8671#   8674
DMD     000040          1395#
DCSEEK  037016          7566     7568#
DCTIM   003502          1963#    3265*   3274*   3945
DRA     000001          1377#    3441    3534
DROY    000200          1384#
DRIVS   003454          1947#    3349*   3356*   3373    3388*   3414*   3431    3522*   3586    9398    9430*
DRIVO   003456          1952#    3247    3351    3390    3490    8473
DRIV1   003460          1953#
DRIV2   003462          1954#
DRIV3   003464          1955#
DRIV4   003466          1956#
DRIV5   003470          1957#
DRIV6   003472          1958#
DRIV7   003474          1959#
DROT    000040          1382#
DRPAR   000010          1361#
DRVMSK  000007          1341#    3407    3507
DR.PTR  001346          1794#    3247*   3591    3601*
DSC     040000          1388#
DSWR    177570          1193#    1693    3153
DTE     010000          1370#
DTYE    000040          1363#    3828    3849
DT1     066606          1984     1990    1996    2002    2007    2013    2019    2025    2031    2037    2042    2047    2052
                        2088     2093    2099    2105    2110    2115    2120    2125    2130    2135    2140    2145    2150
                        2155     2160    2215    2265    2270    2295    2320    2345    2380    2385    2390    2395    2400
                        2405     2410    2415    2420    2425    2430    2435    2440    2475    2480    2485    2490    2510
                        2515     2530    2535    2540    2545    2550    2575    2580    2585    2590    2595    2625    2670
                        2675     2710    2725    2730    2735    2740    2750    2765    2775    2785    2790    2811    2816
                        2881     2977    2982    2987    3002    3007    3017    3022    3027    3032    3037    3062    3067
                        3073    11328#
DT10    067012          2997    11352#
DT11    067030          2780    11355#
DT12    067034          3012    11356#
DT13    067054          2057     2062    2067    2072    2195    2200    2225    2230    2235    2240    2245    2250    2255
                        2260     2275    2280    2285    2290    2300    2305    2310    2315    2325    2330    2335    2340
                        2360     2365    2370    2375    2445    2450    2455    2460    2555    2560    2565    2570    2645
```

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                    2650    2655    2660    2685    2690    2695    2700    2715    2720    2841    2846    2851    2856
                    2896    2901    2906    2911    2916    2921    2926    2931    2936    2941    2946    2951    2956
                    2961    3042    3047   11359#
DT14     067114     2077    2082    2165    2170    2185    2190    2350    2355    2465    2470    2500    2505    2600
                    2615    2620    2891    2966    2971    3052    3057   11366#
DT15     067164     2205    2210    2220   11374#
DT3      066630     2760   11331#
DT4      066652     2175    2180    2665    2680    2705    2821    2826    2831    2836    2861    2866   11334#
DT5      066672     2605    2610    2630    2635    2745   11337#
DT6      066714     2495   11340#
DT7      066734     2640   11343#
DT8      066754     2795    2800    2806    2886   11346#
DT9      066774     2992   11349#
D.ACLO= 000100      1437#
D.BRHM= 000100      1424#   3680    3936    3956    3990    4026    4053    4080    4214    4248    4279    4360    4394
                    4580    4614    4655    4775    4806    4894    4917    4967    4995    5029    5124    5200    5265
                    5353    5411    5483    5590    5618    5649    5736    5810    5915    5939    5973    6050    6116
                    6142    6173    6305    6397    6420    6470    6498    6532    6706    6737    6768    6816    7026
                    7052    7083    7251    7273    7304    7378    7401    7432    7594    7616    7647    7721    7744
                    7775    7952    7974    8005    8079    8102    8133    8331
D.CART= 000400      1426#   3680    3936    3956    3990    4026    4053    4080    4214    4248    4279    4360    4394
                    4580    4614    4655    4775    4806    4894    4917    4967    4995    5029    5124    5200    5265
                    5353    5411    5483    5590    5618    5649    5736    5810    5915    5939    5973    6050    6116
                    6142    6173    6305    6397    6420    6470    6498    6532    6706    6737    6768    6816    7026
                    7052    7083    7251    7273    7304    7378    7401    7432    7594    7616    7647    7721    7744
                    7775    7952    7974    8005    8079    8102    8133    8331
D.DDT = 000400      1412#   3822    3843
D.DOOR= 000200      1425#   3680    3936    3956    3990    4026    4053    4080    4214    4248    4279    4360    4394
                    4580    4614    4655    4775    4806    4894    4917    4967    4995    5029    5124    5200    5265
                    5353    5411    5483    5590    5618    5649    5736    5810    5915    5939    5973    6050    6116
                    6142    6173    6305    6397    6420    6470    6498    6532    6706    6737    6768    6816    7026
                    7052    7083    7251    7273    7304    7378    7401    7432    7594    7616    7647    7721    7744
                    7775    7952    7974    8005    8079    8102    8133    8331
D.DRA = 00004C      1409#   3675    3678    3934    3954    3989    4024    4051    4078    4212    4246    4277    4358
                    4392    4578    4612    4649    4773    4804    4892    4915    4965    4993    5027    5122    5198
                    5263    5351    5409    5481    5588    5616    5647    5734    5808    5913    5937    5971    6048
                    6114    6140    6171    6303    6395    6418    6468    6496    6530    6704    6735    6766    6814
                    7024    7050    7081    7249    7271    7302    7376    7399    7430    7592    7614    7645    7719
                    7742    7773    7950    7972    8003    8077    8100    8131    8329
D.DRDY= 000200      1411#   3954    3988    4094    4212    4246    4277    4358    4392    4578    4612    4649    4773
                    4804    4892    4915    4993    5027    5122    5198    5263    5351    5409    5481    5616    5647
                    5734    5808    5937    5971    6048    6140    6171    6303    6395    6418    6496    6530    6735
                    6766    6814    7050    7081    7271    7302    7399    7430    7614    7645    7742    7773    7972
                    8003    8100    8131    8329
D.DROT= 020000      1444#
D.DSC = 040000      1418#   3954    4212    4277    4358    4578    4649    4773    4892    4965    4993    5616    5734
                    5937    6140    6395    6468    6496    6735    7050    7271    7399    7614    7742    7972    8100
                    8324    8329
D.FLT = 000200      1438#   3890    4278    4654    4893    4966    6396    6469    8318    8330
D.FORM= 001000      1413#   5345    5403
D.FWD = 002000      1428#   4011    4026    4041    4068    4080    5590    6116    6706    7251    7594    8079
D.HDFL= 000200      1452#
D.HDHM= 000040      1423#   3680    3936    9046
D.IDAE= 000040      1436#   4654    4724    8315    8330    8369
D.ILF = 000400      1439#
D.LIMC= 020000      1458#   4968    6471    9029
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D.LOAD= 010000          1430*   4026    9063
D.MMD  = 000400         1453*
D.MMOV= 010000          1457*   4968    6471
D.OFF  = 002000         1414*
D.PWR  = 001000         1440*   3874    3893    4278    4893    6396
D.PIP  = 020000         1417*   4024    4051    4078    4965    5588    5913    6114    6468    6704    7024    7249    7376
                        7592    7719    7950    8077    8321
D.PLO  = 004000         1456*
D.REV  = 004000         1429*   4053    4967    5915    6470    7026    7378    7721    7952
D.RTZ  = 020000         1431*   4053    4080    4205    4351    4571    5909    5915    9353
D.SECT= 000020          1449*
D.SKI  = 002000         1441*   4654    4966    6469    8330
D.SPIN= 010000          1416*   3926    3934    3954    3988    4024    4051    4078    4110    4212    4246    4277    4358
                        4392    4578    4612    4649    4773    4804    4892    4915    4965    4993    5027    5122    5198
                        5263    5351    5409    5481    5588    5616    5647    5734    5808    5913    5937    5971    6048
                        6114    6140    6171    6303    6395    6418    6468    6496    6530    6704    6735    6766    6814
                        7024    7050    7081    7249    7271    7302    7376    7399    7430    7592    7614    7645    7719
                        7742    7773    7950    7972    8003    8077    8100    8131    8329
D.SP_S= 010000          1443*
D.SPOK= 001000          1427*   3644    3956    3990    4026    4053    4080    4138    4214    4248    4279    4360    4394
                        4580    4614    4655    4775    4806    4894    4917    4967    4995    5029    5124    5200    5265
                        5353    5411    5483    5590    5618    5649    5736    5810    5915    5939    5973    6050    6116
                        6142    6173    6305    6397    6420    6470    6498    6532    6706    6737    6768    6816    7026
                        7052    7083    7251    7273    7304    7378    7401    7432    7594    7616    7647    7721    7744
                        7775    7952    7974    8005    8079    8102    8133    8331
D.SSP  = 000020         1422*   3956    3990    4053    4080    4214    4248    4279    4360    4394    4580    4614    4655
                        4775    4806    4894    4917    4967    4995    5029    5124    5200    5265    5353    5411    5483
                        5590    5618    5649    5736    5810    5915    5939    5973    6050    6116    6142    6173    6305
                        6397    6420    6470    6498    6532    6706    6737    6768    6816    7026    7052    7083    7251
                        7273    7304    7378    7401    7432    7594    7616    7647    7721    7744    7775    7952    7974
                        8005    8079    8102    8133    8331
D.SUNS= 040000          1459*
D.TIB  = 002000         1455*
D.JNLD= 040000          1432*   4943    4967    6446    6470
D.UNS  = 040000         1445*
D.VV   = 000100         1410*   3673    3678    3758    3772    3934    3954    3998    4024    4051    4078    4212    4246
                        4277    4358    4392    4578    4612    4649    4773    4804    4892    4915    4965    4993    5027
                        5122    5198    5263    5351    5409    5481    5588    5616    5647    5734    5808    5913    5937
                        5971    6048    6114    6140    6171    6303    6395    6418    6468    6496    6530    6704    6735
                        6766    6814    7024    7050    7081    7249    7271    7302    7376    7399    7430    7592    7614
                        7645    7719    7742    7773    7950    7972    8003    8077    8100    8131    8329
D.WCJR= 000040          1450*
D.WGAT= 000100          1451*
D.WLE  = 004000         1442*
D.WRL  = 004000         1415*
D.XERR= 001000          1454*
ECCW   = 020000         1403*
ECH    = 000100         1364*
EMTVEC= 000030          1282*    3137*   3138*
EM1     057255          8499    10629*
EM10    057735          2017    10684*
EM11    060000          2023    10690*
EM12    060044          2029     2378    2383    2388    2393    2398    2408    2433    2513    2538    2593    2628    2738
                       10696*
EM13    060075          2035     2213    2263    2413    2438    2543    2573    2814   10701*
EM14    060117          2040    10705*
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EM15	060144	2045	10709#									
EM16	060156	2050	3034	10714#								
EM17	060223	2055	2193	2223	2243	2273	2296	2323	2348	2368	2443	2553
			2643	2683	2839	2924	2944	2954	10718#			
EM18	060236	2060	2198	2228	2248	2278	2303	2328	2353	2373	2448	2558
			2648	2688	2894	2924	2914	2934	10720#			
EM19	060251	2065	2233	2253	2283	2308	2333	2358	2453	2498	2508	2563
			2653	2693	2849	2929	2949	2959	3040	10722#		
EM20	060327	1980	10637#									
EM20	060264	2070	2238	2258	2288	2313	2338	2363	2458	2503	2568	2658
			2698	2854	2899	2909	2919	2939	3045	10724#		
EM21	060277	2086	2608	2633	2668	2708	2743	10726#				
EM22	060321	2091	10730#									
EM23	060360	2093	10736#									
EM24	060440	2103	10744#									
EM25	060464	2108	10748#									
EM26	060512	2113	10752#									
EM27	060532	2118	10755#									
EM28	060553	2123	10758#									
EM29	060600	2128	10762#									
EM30	057416	1994	10647#									
EM31	060647	2133	10769#									
EM32	060700	2138	10774#									
EM33	060726	2143	2824	10778#								
EM34	060752	2148	10782#									
EM35	061015	2153	10787#									
EM36	061040	2158	10792#									
EM36	061113	2163	2173	2663	2758	2793	2804	2864	10800#			
EM37	061153	2168	10806#									
EM38	061213	2178	2678	2703	2798	2859	10812#					
EM38	061264	2183	2423	2463	2598	2613	2723	2964	10819#			
EM40	061321	2188	2428	2468	2618	10824#						
EM41	061347	2889	2969	10828#								
EM43	061410	2203	10834#									
EM44	061437	2208	10838#									
EM45	061473	2343	10843#									
EM46	061614	2075	3050	10857#								
EM47	061627	2080	3055	10859#								
EM48	061642	2488	2493	10861#								
EM49	061655	2318	10863#									
EM50	057464	1988	3071	10654#								
EM50	061743	2268	10873#									
EM51	062014	2293	10880#									
EM52	062114	2473	10891#									
EM53	062153	2478	10897#									
EM54	062224	2483	10902#									
EM55	062237	2528	10907#									
EM56	062272	2778	10912#									
EM57	062315	3010	10916#									
EM58	062361	3015	10921#									
EM59	062417	2548	10928#									
EM60	057505	1994	10657#									
EM60	062450	2578	10933#									
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EM64	062561	2218	10946#									

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EM65    062610          2638   10950#
EM66    062630          2728   10953#
EM67    062664          2643   10958#
EM68    062722          2733    2788   10964#
EM69    062762          2743   10970#
        057526          2000   10660#
        063002          3020    3025    3030    3035   10973#
        063016          2783   10975#
        063036          2588    2623   10978#
        063063          3060   10982#
        063124          2809   10985#
        063131          2819   10989#
        063154          2829   10993#
        063200          2849   10996#
        063226          2884   11000#
        063313          3065   11009#
EM80    057615          2005   10670#
EM81    063334          2975   11012#
EM82    063364          2980   11016#
EM83    063412          2985   11020#
EM84    063437          2990    2995   11024#
EM85    063477          3000    3005   11030#
EM86    063527          2533   11035#
EM87    063560          3061    3066    3072   11040#
EM88    063645          2748    2763   11049#
EM89    063672          2403   11053#
EM90    063763          2418   11063#
EM9     057665          2011   10677#
ERRVEC= 000304          1275#   3151    3152#   3163#   3170#   3171#   3184#   3185#   3250#   3254#   3261#   3299#   3317#
                        9488    9489#   9491#   9494#
ESEC    001404          1813#   4842#   4843#   4853   11340
E.AC    003424          1923#   3675#   3678#   3934#   3954#   3988#   4024#   4051#   4078#   4212#   4246#   4277#   4358#
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                        7742#   7773#   7950#   7972#   8003#   8077#   8100#   8131#   8329#   8694#   8701    8703#   8732
                       11359   11366   11374
E.A1    003430          1925#   3680#   3936#   3956#   3990#   4026#   4053#   4080#   4214#   4248#   4279#   4360#   4394#
                        4580#   4614#   4655#   4775#   4806#   4894#   4917#   4967#   4995#   5029#   5124#   5200#   5265#
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                        6142#   6173#   6305#   6397#   6420#   6470#   6498#   6532#   6706#   6737#   6768#   6816#   7026#
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                        7775#   7952#   7974#   8005#   8079#   8102#   8133#   8331#   8695#   8705    8707#   8752   11359
                       11366   11374
E.A2    003434          1927#   3682#   3958#   3992#   4216#   4250#   4281#   4362#   4396#   4582#   4616#   4657#   4777#
                        4808#   4919#   4997#   5031#   5126#   5202#   5267#   5355#   5413#   5485#   5620#   5651#   5738#
                        5812#   5941#   5975#   6052#   6144#   6175#   6307#   6422#   6500#   6534#   6739#   6770#   6818#
                        7054#   7085#   7275#   7306#   7403#   7434#   7618#   7649#   7746#   7777#   7976#   8007#   8134#
                        8135#   8696#   8709    8711#  11366   11374
E.A3    003440          1929#   8697#
E.B0    003426          1924#   3679#   3935#   3955#   3989#   4025#   4052#   4079#   4213#   4247#   4278#   4359#   4393#
                        4579#   4613#   4652#   4654#   4774#   4805#   4893#   4916#   4966#   4994#   5028#   5123#   5199#
                        5264#   5352#   5410#   5482#   5589#   5617#   5648#   5735#   5809#   5914#   5938#   5972#   6049#
                        6115#   6141#   6172#   6304#   6396#   6419#   6469#   6497#   6531#   6705#   6736#   6767#   6815#
                        7025#   7051#   7082#   7250#   7272#   7303#   7377#   7400#   7431#   7593#   7615#   7646#   7720#
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		7743*	7774*	7951*	7973*	8004*	8078*	8101*	8132*	8330*	8713	8715*	8742	11359
		11366	11374											
E.B1	003432	1926*	3681*	3937*	3957*	3991*	4027*	4054*	4081*	4215*	4249*	4280*	4361*	4395*
		4581*	4615*	4656*	4775*	4807*	4895*	4918*	4968*	4996*	5030*	5125*	5201*	5266*
		5354*	5412*	5484*	5591*	5619*	5650*	5737*	5811*	5916*	5940*	5974*	6051*	6117*
		6143*	6174*	6306*	6398*	6421*	6471*	6499*	6533*	6707*	6738*	6769*	6817*	7027*
		7053*	7084*	7252*	7274*	7305*	7379*	7402*	7433*	7595*	7617*	7648*	7722*	7745*
		7776*	7953*	7975*	8006*	8080*	8103*	8134*	8332*	8717	8719*	8762	11359	11366
		11374												
E.B2	003436	1928*	3683*	3959*	3993*	4217*	4251*	4282*	4283*	4363*	4397*	4583*	4617*	4658*
		4778*	4809*	4920*	4998*	5032*	5127*	5203*	5268*	5356*	5414*	5486*	5621*	5652*
		5739*	5813*	5942*	5976*	6053*	6055*	6145*	6176*	6308*	6423*	6501*	6535*	6740*
		6771*	6819*	7055*	7086*	7276*	7307*	7404*	7435*	7619*	7650*	7747*	7778*	7977*
		8008*	8105*	8136*	8721	8723*	11366	11374						
E.B3	003442	1930*	3684*	3960*	3994*	4218*	4252*	4364*	4398*	4584*	4618*	4661*	4665*	4667*
		4779*	4810*	4921*	4999*	5033*	5128*	5204*	5269*	5357*	5415*	5487*	5622*	5653*
		5740*	5814*	5943*	5977*	6054*	6146*	6177*	6309*	6424*	6502*	6536*	6741*	6772*
		6820*	7056*	7087*	7277*	7308*	7405*	7436*	7620*	7651*	7748*	7779*	7978*	8009*
		8106*	8137*	8725	8727*	11374								
FATT1	044512	3950	4209	4355	4575	4730	4989	5062	6492	6599	8375	8624*	9332	9354
FATT2	044636	4766	5609	5724	5930	6037	6133	6218	6565	6726	6869	6931	7043	7166
		7264	7392	7512	7607	7735	7855	7918	7965	8093	8213	9286	8651*	
FHOHM	047020	4984	6487	9043*	9051									
FHCTRB	047142	5465	5792	6645	6670	6793	9076*							
FLGTST	047406	9123	9127	9143*										
FLIM	046742	4939	6442	9025*										
FLOAD	047074	4986	6489	9060*										
FMTE =	000020	1362*												
FMT1	001440	1832*	9086*	9087*	9088*	9093								
FNS22	046322	4840	8937*											
FORM	031646	6607*	9369											
FORMAT	001436	1831*	5464*	5791*	6644*	6675*	9086	9120						
FRCYL	001350	1796*	4328*	4464	4465	4480	4482	4486	4525*	4526	4528	5578*	5899*	6096*
		6192*	6678*	6845*	6856*	7007*	7141*	7227*	7238	7369	7370	7445	7457	7484
		7570*	7581	7712	7713	7788	7800	7827	7928*	7939	8070	8071	146	9158
		8185	8296*	11334	11346	11352								
FRCY	044176	3383	3397	3402	3497	3502	3632	3769	3841	3922	3981	4126	4200	4239
		4273	4346	4385	4427	4449	4475	4512	4566	4605	4645	4708	4715	4762
		4797	4888	4908	4935	5020	5058	5101	5188	5242	5331	5343	5378	5401
		5471	5509	5586	5640	5681	5720	5798	5836	5904	5964	5994	6033	6112
		6164	6214	6296	6391	6411	6438	6523	6561	6595	6656	6702	6759	6804
		6865	6927	6945	7022	7074	7115	7162	7247	7295	7335	7374	7423	7463
		7508	7590	7638	7678	7717	7766	7806	7851	7914	7948	7996	8036	8075
		8124	8164	8209	8282	8310	8353	8360	8553*	8556	8826	8888	9328	9345
		9361												
FRDY1	044244	8568*	8571	8842	8852	8862	8871							
FS022	046236	4836	8917*											
FTITLE	001344	1792*	8446	8448*										
GBA	044100	3219	8513*											
GDRVS	043740	3217	8468*											
GINT	044126	3221	8526*											
GNS =	****** U	1483	10392	10393	10394	10395	10396	10398	10400	10401	10402	10403	10404	10405
		10406												
GO =	000001	1326*												
GSTAT	045534	3643	3672	3724	3757	3800	3889	3925	4010	4040	4067	4093	4109	4137
		4204	4350	4570	4723	4938	5116	5190	5257	5333	5393	5473	5523	5696

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                        5800    5850    5908    6009    6298    6441    6658    6806    6963    7130    7350    7478    7693
                        7821    8051    8179    8369    8634    8638    8658    8662    8822*   8892    8903    8956    8971
                        9028    9045    9062    9349
$STAT   045576          8692    8835*
.=SWR = 104406          8457   10398*
HASOF   003352          1895*   8592*   8608    11328   11363   11371   11380
HBA     003342          1891*   8588*
HCS1    003334          1889*   3404    3504    3802    3852    3877    3896    3899    4768    5103    5191    5244    5334
                        5380    5474    5511    5611    5683    5726    5801    5838    5932    5996    6039    6135    6222
                        6299    6567    6659    6730    6807    6871    6933    6947    7045    7117    7168    7266    7337
                        7394    7465    7514    7609    7680    7737    7808    7857    7920    7967    8038    8095    8166
                        8215    8288    8585*   8798    8802    8893    11328   11331   11337   11340   11356   11363   11371
                       11380
HCS2    003336          1889*   3437    3439    3443    3455    3530    3532    3536    3533    3788    3805    8586*   8807
                        8811   11328   11331   11337   11340   11356   11363   11371   11380
HDA     003344          1892*   8589*   11337   11343   11349   11352   11356
HDB     003356          1897*
HDC     003354          1896*   8593*   11331   11334   11346   11356   11363   11371   11380
HDS     003346          1893*   3441    3534    3825    3846    8590*   11328   11331   11337   11363   11371   11380
HDTAB   001470          1852*   5176    5184*   5458    5535    5785    5862    6648    6797    9078
HDWC    001454          1840*   5296*   5297    5435*   5436    5537*   5539    5864*   5866    11343
HDI     001434          1830*   9080*   9081*   9082*   9083*   9084*   9085*   9092
HERR    001430          1828*   5085*   5094*   5095    5096*   5145*   5146    5167*   5178*   5179    5180*   5182    5222*
                        5223    5226*   5235*   5236    5237*   5286*   5287    5288*   5293    5304*   5305    5463*   5790*
                        6643*   6650*   6651    6652*   6666*   6667    6674*   6696*   6697    6698*   6794*   6795    6796*
                        6834*   6835    6841    6843*   6917*   6918    9080    9155
HERDA   001432          1829*   3700    4628    4690    9015*   9016*   9017*   9018*
HER     003350          1894*   3828    3849    8591*   11328   11331   11337   11363   11371   11380
HMR1    003360          1898*   8594*
HMR2    003362          1899*   3406    3506    3644    3673    3725    3758    3772    3822    3843    3926    4011    4041
                        4068    4094    4110    4138    4205    4351    4571    4943    5345    5403    5909    6446    8321
                        8324    8572*   8577*   8595*   8844    8854    8864    8873    8957    9046    9063    9350   11328
                       11331   11334   11337   11340   11343   11346   11349   11352   11356
HMR3    003364          1900*   3874    3890    3893    4724    8315    8318    8369    8573*   8578*   8596*   8845    8855
                        8865    8874    8904    8972    9029   11328   11331   11334   11337   11340   11343   11346   11349
                       11352   11356
HS      044332          8557    8561    8585*   8836
HSTAT   003370          1902*   8598*
HSYNC   003322          1870*   3246*   6847    6851*   9337*
HTOS    003366          1901*   8597*
HT      000011          1185*   9623    9664
I.BC  = 000400          1366*
IMC     003340          1890*   8587*
IN      001370          1805*   4006    4036    4063    4089    9222
INT.A0  003404          1912*   8732    8873*   11359   11369   11377
INT.A1  003410          1914*   8752    8864*   11359   11369   11377
INT.A2  003414          1916*   8854*   8982    11369   11377
INT.A3  003420          1918*   8844*
INT.B0  003406          1913*   8742    8874*   11359   11369   11377
INT.B1  003412          1915*   8762    8865*   11359   11369   11377
INT.B2  003416          1917*   8855*   8995    11369   11377
INT.B3  003422          1919*   8845*   9005    9015    11377
IOAE  = 002000          1368*
IE    = 000100          1327*
ILF   = 000001          1358*
INTER   050556          8541    9434*
```

```
INVCYL  003304          1860#   8305
INTVEC= 000020          1280#   3135*   3136*
IR      = 000100        1345#
LOLKF   003476          1961#   3252*
LSVEC   001330          1782#   3253
LF      = 000012        1186#   9658    9664    10414   10419   10421   10426   10430   10440   10449   10456   10464   10469
                        10474   10479   10485   10492   10500   10505   10510   10514   10518   10521   10526   10531   10535
                        10539   10545   10550   10553   10558   10562   10564   10567   10570   10575   10579   10589   10597
                        10606   10612   10616   10619   10622   10629   10647   10951   10921   11053   11057   11063   11070
MEMERR  001460          1843#   6626    9025*   9033*
MKS     001326          1780#   3251    9211*   9232*
MPFLG   001410          1816#   4149    4157*   4162*   4880*   5064*   5754    5760*   5765*   6068    6073*   6078*   6236
                        6244*   6250*   6383*   6583    6601*   6887    6899    6905*   6911*   6976*   6981*   7184    7192*
                        7198*   7530    7536*   7541*   7546*   7551*   7873    7879*   7884*   7889*   7894*   8231    8237*
                        8242*   8247*   8252*   9291*
MCLK    = 000400        1398#
MOS     = 001000        1348#   3437    3530    8811
MOTST   007070          1495    3093#
MOTSTA  007110          1497    3098#
MEMBAS= 172100          1786#   3173    3182
MEMERR  050514          3176    9420#
MEMPAR  007442          3170#
MEMVEC= 000114          1785#   3176*   3177*
MERD    = 001000        1399#
MESMSK= 000017          1393#
MEMC    = 002000        1400#
MINO    = 000200        1397#
MODTST  001342          1791#   3080*   3085*   3090*   3095*   3100*   3104*   6622    6690    6720    6830    7003    7565
MSG1    055116          8449    10414#
MSG10   056322          3348    3387    10535#
MSG11   056347          9461    10539#
MSG12   056407          6638    10545#
MSG13   056440          3275    10550#
MSG14   056516          8680    10558#
MSG15   056541          3457    3602    10562#
MSG16   056553          3722    10564#
MSG17   056571          6357    10567#
MSG18   056606          5106    5118    5194    5247    5259    5337    5383    5395    5477    5514    5525    5696    5698
                        5804    5841    5852    5999    6011    6662    6810    6950    6962    7120    7132    7340    7352
                        7468    7480    7683    7695    7811    7823    8041    8053    8169    8181    10570#
MSG19   056642          3588    10575#
MSG2    056020          3201    10500#
MSG20   056672          6624    10579#
MSG21   057041          7005    10597#
MSG22   057121          7002    10606#
MSG3    056056          3216    10505#
MSG4    056110          3218    10510#
MSG5    056136          3220    10514#
MSG6    056163          9436    10518#
MSG7    056201          3235    10521#
MSG74   057151          9318    10612#
MSG75   057200          9320    10616#
MSG76   057222          9373    10619#
MSG77   057240          9377    10622#
MSG8    056236          4326    10526#
MSG9    056274          4323    10531#
```

```
MSP    = 000100          1396#
MULT6    047572          9173    9199#
M.ALGN= 040000           1472#
M.CADD= 017760           1471#   8973    8996
M.CDIF= 017760           1464#   8958    8983
M.DRV  = 000007          1463#
M.HEAD= 007000           1474#   9016
M.ID   = 000003          1470#
M.OFST= 017760           1465#
M.PAR  = 100000          1475#   9261
M.SECT= 000760           1473#   8905    9006
M.SER  = 077770          1466#
MED    = 010000          1351#   3443    3455    3536    3539    8807
MEM    = 004000          1350#
MJDRV    011356          3275    3469    3568#   8400
MXF    = 000004          1360#
OFFSET= 000015           1318#
OFST   = 000004          1379#
OPI    = 020000          1371#
OR     = 000200          1346#
PACK   = 000003          1313#   3767
PARAM    001336          1789#   3078*   3083*   3088*   3093*   3098*   3102*   3213
PARSRT   007006          1491    3078#
PAT    = 000020          1394#   3888    4269    4415    4463    4884    6387
PCA    = 004000          1401#
PCD    = 010000          1402#
PCLKF    003500          1962#   3256*   3263*   9209    9230
PCVEC    001332          1783#   3257    3264
PCYL     001356          1799#   4331*   4419    4424*   4467    4472*
PFSRT    011646          3655#   9463
PGE    = 002000          1349#
PIP    = 020000          1387#
PIRQ   = 177772          1192#
PIRQVE= 000240           1286#
PKRB     001324          1779#
PKS      001320          1777#   3255    3262    9214*   9234*
PKSB     001322          1778#   9213*
PRTP     003452          1946#   3204*
PRGSRT   007146          3081    3086    3091    3096    3101    3105#   8500
PRO    = 000000          1209#   3107    3294
PR1    = 000040          1210#
PR2    = 000100          1211#
PR3    = 000140          1212#
PR4    = 000200          1213#
PR5    = 000240          1214#   1776
PR6    = 000300          1215#   3267
PR7    = 000340          1216#   3171    3177    9458    9459
PS     = 177776          1189#   1190
PSEC     001402          1812#   4839*   4842    4844*   4846    4849    8940    8943    11340
PSW    = 177776          1190#
PWRVEC= 000024           1281#   3141*   3142*   9448*   9457*   9458*
RCYLA    046620          8778    8995#
RCYLD    046546          8774    8982#
RDCHR  = 104410          10066   10401#
RDCYLA   046476          4433    4481    4749    8970#
RDCYLC   046412          4438    4490    4496    4501    8955#
```

```
RKDATA= 000021          1320#  6294
RKGATE= 100000          1405#
RKHEAD= 000025          1322#  5099  5240  5376  5507  5675  5834  5992  6943  7113  7333  7461  7676
                        7804   8034  8162
RKLIN = 104411          8468  10140 10402#
RKOCT = 104412          8513   8526 10403#
RKSEC   046166          4845   4848  8902#  8919  8922  8939  8942  9171
RCY   = 000200          1328#  8553  8568
RECAL = 000013          1317#  4196  4342  4562  4706  5902  8351  9341
RESREG= 104414         10200  10270 10405# 11581
RESVEC= 000010          1276#
RHEAD   046714          8783   9015#
RHTAB   062674          1853#  5098  5239  5290  5375  5431  5505  5528  5678  5703  5707  5832  5855
                        5991   6015  6019  6942  6966  7112  7136  7332  7356  7460  7484  7675  7699
                        7803   7827  8033  8057  8161  8185  9178  9180  9184  9187 11349 11352
RKASOF= 000016          1299#  3308  8592  8627  8653
RKBA  = 000004          1294#  3304  5176* 5325* 5458* 5785* 6298* 6331* 6350* 6648* 6797* 8588
RKCS1 = 000000          1292#  3301  3400* 3500* 3630* 3641* 3767* 3839* 3920* 3948* 3977* 3979* 4005*
                        4018*  4107* 4124* 4135* 4194* 4196* 4235* 4237* 4271* 4340* 4342* 4381* 4383*
                        4425*  4431* 4445* 4447* 4473* 4479* 4508* 4510* 4560* 4562* 4601* 4603* 4643*
                        4704*  4706* 4711* 4713* 4728* 4760* 4793* 4795* 4886* 4904* 4906* 4933* 4937*
                        5016*  5018* 5056* 5099* 5186* 5240* 5329* 5341* 5376* 5399* 5469* 5507* 5584*
                        5636*  5638* 5679* 5718* 5796* 5834* 5902* 5906* 5960* 5962* 5992* 6031* 6110*
                        6160*  6162* 6212* 6294* 6389* 6407* 6409* 6436* 6440* 6519* 6521* 6559* 6593*
                        6654*  6700* 6755* 6757* 6802* 6863* 6925* 6943* 7020* 7070* 7072* 7113* 7160*
                        7245*  7291* 7293* 7333* 7372* 7419* 7421* 7461* 7506* 7588* 7634* 7636* 7676*
                        7715*  7762* 7764* 7804* 7849* 7912* 7946* 7992* 7934* 8034* 8073* 8120* 8122*
                        8162*  8207* 8280* 8308* 8349* 8351* 8356* 8358* 8373* 8553  8568  8585  8824*
                        8837*  8840* 8847* 8850* 8857* 8860* 8867* 8869* 9326* 9339* 9341* 9357* 9359*
RKCS2 = 000010          1296#  3302  3381* 3395* 3399* 3495* 3499* 3799* 3978* 4195* 4236* 4341* 4382*
                        4446*  4509* 4561* 4602* 4705* 4712* 4794* 4905* 5017* 5114  5175* 5255  5324*
                        5391   5521  5637* 5694  5848  5961* 6007  6161* 6408* 6520* 6756* 6958  7071*
                        7128   7292* 7348  7420* 7476  7635* 7691  7763* 7819  7993* 8049  8121* 8177
                        8350*  8357* 8586  8823* 8838* 9848* 9858* 8968* 8886* 8890* 9340* 9358*
RKDA  = 000006          1295#  3305  4640* 5095* 5179* 5236* 5287* 6290* 6333* 6352* 6651* 6697* 6795*
                        6922*  8589
RKDB  = 000024          1301#  3310  5109  5110  5111  5250  5251  5252  5386  5387  5388  5517  5518
                        5519   5689  5690  5691  5844  5845  5846  6002  6003  6004  6953  6954  6955
                        7123   7124  7125  7343  7344  7345  7471  7472  7473  7686  7687  7688  7814
                        7815   7816  8044  8045  8046  8172  8173  8174
RKDC  = 000020          1300#  3309  4270* 4416* 4432* 4464* 4480* 4885* 4932* 5467* 5503* 5581* 5676*
                        5794*  5830* 6029* 6108* 6210* 6292* 6388* 6435* 6557* 6695* 6799* 5861* 7018*
                        7109*  7158* 7243* 7329* 7369* 7457* 7504* 7586* 7672* 7712* 7800* 7847* 7910*
                        7944*  8030* 8070* 8158* 8205* 8307* 8593
RKDS  = 000012          1297#  3306  8590
RKECPS= 000030          1305#  3314  8597
RKECPT= 000032          1306#  3315  8598
RKER  = 000014          1298#  3307  8591
RKMR1 = 000026          1302#  3311  3642* 3723* 3756* 3888* 4009* 4039* 4066* 4092* 4108* 4136* 4203*
                        4269*  4349* 4415* 4463* 4569* 4884* 5907* 6387* 8594  8633* 8637* 8657* 8661*
                        8839*  8849* 8859* 8891* 8902* 8955* 8970* 9027* 9044* 9061* 9348*
RKMR2 = 000034          1303#  3312  8572  8577  8595
RKMR3 = 000036          1304#  3313  8573  8578  8596
RKPRI   001316          1776#  8542
RKVEC   001314          1775#  3240* 8530* 8533* 8540
RKWC  = 000002          1293#  3303  5177* 5326* 5459* 5786* 6293* 6649* 6798* 8587
```

```
RLS    = 000010          1342#   3799
RSEC     046656          8782    9005#
SAVREG= 104413          10185   10244   10404#  11525
SBPAR    047732          8702    8706    8710    8714    8718    8722    8726    9247#
SCLR   = 000040          1344#   3381    3395    3495    8836
SCOP1  = 104415          3392    3492    3761    3793    3833    3882    4187    4262    4333    4408    4457    4552    4633
                         4754    5088    5169    5227    5368    5497    5669    5824    6101    6684    6786    7011    7101
                         7231    7322    7362    7450    7574    7665    7705    7793    7932    8023    8063    8151    8299
                        10406#
SCOP1$   050004          9271#   10406
SDC    = 000000          1173    1494    10413   11591
SEC      001374          1809#   4007*   4037*   4064*   4090*   9223*
SECFLG   047336          9098    9119#
SECNT    001400          1811#   4834*   4856*   5366*   5496*   5823*
SECTOR   001406          1814#   4844    4846    4849    4853    8904*   8905*   8906*   8907*   8908*   8909*   8920    8923
                         8940    8943    9005*   9006*   9007*   9008*   9009*   9010*   9172*   9176    9177*   9178*   9189
                         9199*   9200    9201*   9202*
SEEK   = 000017          1319#   4271    4425    4473    4643    4760    4886    4933    5584    5718    6031    6110    6212
                         6389    6436    6559    6700    6863    6925    7020    7160    7245    7372    7506    7588    7715
                         7849    7912    7946    8073    8207    8280    8308
SELDRV= 000001           1312#   3400    3500    3839    5341    5399    8824    8840    8850    8860    8869
SETINT   044160          3241    8531    8540#
SIZFLG   003504          1964#   3242*   3385    8486*   8506*
SKI    = 000002          1359#
SORT     047464          5531    5858    9169#
SPACE2   070064         11559   11568   11579   11590#
SRTSPL= 000011           1316#   3920    5056    6593    9326
SRTTAB   002100          1854#   5534    5861    9181
STACK  = 001100          1180#   3106    3133    3292    3341    3393    3488    3493    3582    3623    3667    3715    3754
                         3762    3784    3794    3818    3834    3870    3883    3915    4181    4188    4263    4319    4334
                         4409    4458    4548    4553    4634    4745    4755    4829    4875    5083    5089    5164    5170
                         5228    5320    5369    5451    5498    5575    5670    5778    5825    5894    6092    6102    6279
                         6378    6621    6685    6787    7000    7012    7102    7225    7232    7323    7363    7451    7563
                         7575    7666    7706    7794    7904    7933    8024    8064    8152    8275    8300    8396    8788
                         9429    9460   11587
START    007132          1487    3102#
START1   007550          3195#
STKLMT= 177774           1191#
STOP     050106          6853    9309#   9907    9990
ST2      007616          3202    3213#
ST3      007662          3203    3231#
ST4      007714          3215    3236    3239#
ST5      007740          3222    3244#   3379    3435    8425    9379
SUBCLR   046106          3627    3637    3669    3719    3764    3786    3796    3820    3836    3872    3885    3917    4121
                         4131    4145    4190    4265    4336    4411    4460    4555    4636    4747    4757    4830    4877
                         4981    5053    5091    5172    5230    5322    5371    5453    5500    5576    5672    5715    5730
                         5780    5827    5896    5986    6027    6043    6094    6104    6207    6224    6232    6281    6318
                         6380    6484    6554    6571    6579    6590    6635    6687    6789    6858    6875    6883    6937
                         7014    7104    7155    7172    7180    7234    7325    7365    7453    7501    7518    7526    7577
                         7668    7708    7796    7844    7861    7869    7907    7924    7935    8026    8066    8154    8202
                         8219    8227    8277    8292    8302    8886#   9311    9323
SVAL   = 100000          1389#
SWR      001140          1693#   3131    3153*   3155    3161*   3168*   4158    4163    5065    5761    5766    6074    6079
                         6245    6251    6602    6906    6912    6977    6982    7193    7199    7537    7542    7547    7552
                         7880    7885    7890    7895    8238    8243    8248    8253    8455    8738    8748    8758    8769
                         9271    9292    9297    9299    9392    9400    9405    9425    9483    9497    9499    9505    9512
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                        9550    9557    9569    9573    9910    9949   10004*  11583
SWREG   000176          1485#   3161    8455    9910    9949    9972
SWTST   050036          4115    5043    5711    6023    6198    6546    6894    6971    7147    7495    7938    8196    9290#
SW0     =  000001       1244#
SW00    =  000001       1234#   1244
SW01    =  000002       1233#   1243
SW02    =  000004       1232#   1242
SW03    =  000010       1231#   1241
SW04    =  000020       1230#   1240
SW05    =  000040       1229#   1239
SW06    =  000100       1228#   1238
SW07    =  000200       1227#   1237
SW08    =  000400       1226#   1236
SW09    =  001000       1225#   1235
SW1     =  000002       1243#
SW10    =  002000       1224#
SW11    =  004000       1223#
SW12    =  010000       1222#  11583
SW13    =  020000       1221#   9392
SW14    =  040000       1220#   9292    9405
SW15    =  100000       1219#
SW2     =  000004       1242#
SW3     =  000010       1241#
SW4     =  000020       1240#
SW5     =  000040       1239#
SW6     =  000100       1238#
SW7     =  000200       1237#
SW8     =  000400       1236#   9297
SW9     =  001000       1235#   4158    4163    5065    5761    5766    6074    6079    6245    6251    6602    6906    6912
                        6977    6982    7193    7199    7537    7542    7547    7552    7880    7885    7890    7895    8238
                        8243    8248    8253    8738    8748    8758    8768    9271    9400    9425
TBITVE=  000014         1277#
TEMP1   003372          1904#   3382*   3396*   3401*   3406*   3407*   3408    3496*   3501*   3506*   3507*   3508    3631*
                        3768*   3840*   3921*   3930*   4019*   4125*   4199*   4238*   4272*   4345*   4384*   4426*   4448*
                        4474*   4511*   4565*   4604*   4644*   4688*   4689*   4690    4707*   4714*   4761*   4764*   4796*
                        4887*   4907*   4934*   5019*   5057*   5100*   5187*   5241*   5295*   5297    5330*   5342*   5377*
                        5400*   5434*   5436    5470*   5508*   5538*   5539    5585*   5606*   5639*   5680*   5719*   5723*
                        5797*   5835*   5865*   5866    5903*   5929*   5963*   5993*   6032*   6036*   6111*   6131*   6163*
                        6213*   6217*   6295*   6390*   6410*   6437*   6522*   6560*   6564*   6594*   6655*   6701*   6726*
                        6758*   6803*   6864*   6868*   6926*   6930*   6944*   7021*   7041*   7073*   7114*   7161*   7165*
                        7246*   7262*   7294*   7334*   7373*   7390*   7422*   7462*   7507*   7511*   7589*   7605*   7637*
                        7677*   7716*   7733*   7765*   7805*   7850*   7954*   7913*   7917*   7947*   7963*   7995*   8035*
                        8074*   8091*   8123*   8163*   8208*   8212*   8281*   8285*   8309*   8352*   8359*   8555*   8570*
                        8625*   8629*   8655*   8671    8673*   8699    8701*   8703    8705*   8707    8709*   8711    8713*
                        8715    8717*   8719    8721*   8723    8725*   8727    8729*   8822    8925*   8828*   8835    8841*
                        8851*   8861*   8870*   8876*   8887*   8917    8918*   8925*   8927*   8929*   8937    8938*   8945*
                        8947*   8949*   9026*   9031*   9043*   9048*   9060*   9065*   9100*   9103*   9104    9253*   9261*
                        9327*   9344*   9360*  11343
TEMP2   003374          1905#   3949*   4208*   4354*   4574*   4729*   4983*   4988*   5061*   6283*   6321*   6322    6348*
                        6486*   6491*   6598*   8374*   8631*   9050*   9101*   9102*   9104*   9105    9331*   9353*
TEMP3   003376          1906#   4418*   4420    4466*   4468    6284*   6324    6345*   6346    7238*   7240    7581*   7583
                        7939*   7941*   7942
TEMP4   003400          1907#   4419*   4420*   4422*   4423    4467*   4468*   4470*   4471    6287*   6288    6331    6349*
                        6350    7239*   7240*   7241    7582*   7583*   7584    7940*   7941
TEMP5   003402          1908#   4184*   4301*   6289*   6290    6332*   6333    6351*   6352
TIMJP   001376          1810#   4013    4043    4070    4096    9208*   9219*   9225*
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TKVEC = 000060          1284*   9887*   9888*
TOCYL   001352          1797*   4329*   4416    4417    4432    4434    4486    4488    4520*   4521    4528*   5460*   5462
                        5579*   5787*   5799    5899*   6097*   6108    6186    6190    6193*   6210    6227    6229*   6557
                        6574    6576*   6640*   6642    6679*   6846*   6861    6878    6880*   6923*   6966    7008*   7018
                        7096    7109    7136    7143*   7158    7175    7177*   7228*   7239    7243    7317    7329    7356
                        7490    7492*   7504    7521    7523*   7571*   7582    7586    7660    7672    7699    7933    7935*
                        7847    7864    7866*   7929*   7940    7944    8018    8030    8057    8191    8193*   8205    8222
                        8224*   8305*   8306    8307    8340    8343    11334   11346   11349
TPVEC = 000064          1285*
TRAPPC  001334          1787*   9421*   11355
TRAPVE= 000034          1283*   3139*   3140*   9459*
TRTVEC= 000014          1278*
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                        4477    4514    4607    4647    4717    4799    4890    4910    4977    5022    5642    5966    6166
                        6393    6413    6480    6525    6761    7076    7297    7425    7640    7768    7998    8126    8312
                        8362    8606*   9363
TST1    0:0120          3268    3290*
TST10   012170          3718    3752*
TST11   0:2274          3759    3773    3782*
TST12   012402          3806    3816*
TST13   012570          3853    3868*
TST14   012734          3900    3913*
TST15   014430          4116    4179*
TST16   0:5240          4305    4317*
TST17   0:6530          4527    4546*
TST2    010274          3318    3339*
TST20   017572          4743*
TST21   020152          4820    4826*
TST22   020330          4873*
TST23   021422          5044    5081*
TST24   021726          5162*
TST25   022622          5306    5318*
TST26   023420          5449*
TST27   024110          5573*
TST3    011034          3386    3486*
TST30   025220          5712    5776*
TST31   025710          5892*
TST32   027036          6024    6090*
TST33   027760          6199    6277*
TST34   030424          6337    6356    6376*
TST35   031646          6547    6617*
TST36   033750          6895    6972    6998*
TST37   035044          7148    7223*
TST4    011362          3516    7580*
TST40   036770          7496    7561*
TST41   040726          7839    7902*
TST42   042744          8197    8273*
TST5    011514          362..
TST6    011646          3663*
TST7    012032          3701    3713*
TYPDS = 104405          8414    10396*
TYPE  = 104401          3201    3216    3218    3220    3235    3275    3348    3358    3387    3416    3457    3588    3602
                        3610    3722    3743    3744    4323    4326    5106    5118    5194    5247    5259    5337    5383
                        5395    5477    5514    5525    5686    5698    5804    5841    5852    5999    6011    6357    6361
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                    7468    7480    7683    7695    7811    7823    8041    8053    8163    8181    8412    8415    8449
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                    9848    9904    9916    9970    9971    9974    9985    9995   10006   10025   10073   10079   10084
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                   11541   11550   11559   11563   11568   11570   11576   11579
TYPERR  067610      9559   11525#
TYPOC = 104402      9973   10393#  11556
TYPON = 104404     10395#
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T.A2  = 000001      1935#   3667    3963    3997    4221    4255    4286    4367    4401    4587    4621    4671    4782
                    4813    4924    5002    5036    5131    5207    5272    5418    5490    5594    5625    5656    5743
                    5817    5919    5946    5980    6058    6120    6149    6180    6427    6505    6539    6710    6744
                    6775    6823    7030    7059    7090    7255    7280    7311    7382    7408    7439    7598    7623
                    7654    7725    7751    7782    7956    7981    8012    8083    8109    8140    8335    8772
T.B2  = 000002      1936#   3687    3963    3997    4221    4255    4286    4367    4401    4587    4621    4671    4782
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                    6823    7030    7059    7090    7255    7280    7311    7382    7408    7439    7598    7623    7654
                    7725    7751    7782    7956    7981    8012    8083    8109    8140    8335    9776
T.B3  = 000004      1937#   3687    4221    4367    4587    4671    8780
TI    = 001412      1820#   4208    4354    4574    4729    8374    9353
TIO   = 001414      1821#   3382    3396    3401    3496    3501    3631    3768    3840    3921    3980    4125    4199
                    4238    4272    4345    4384    4426    4448    4474    4511    4565    4604    4644    4707    4714
                    4796    4887    4907    4934    4983    4988    5019    5057    5342    5400    5585    5639    5719
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                    6594    6701    6758    6864    6925    7021    7073    7161    7246    7294    7373    7422    7507
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                    8359    8825    8841    8851    8861    8870    8887    9327    9344    9360
T100    001416      1822#   3949    5061    6598    9331
T2500   001422      1824#   5606    6131
T500    001420      1823#   5508    5835    8938
T5000   001424      1825#   5723    6036    6217    6564    6868    6930    7165    7262    7390    7511    7605    7733
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T50000  001426      1826#   5100    5187    5241    5330    5377    5470    5680    5797    5993    6295    6655    6803
                    6944    7114    7334    7462    7677    7805    8035    8163
UFE   = 000400      1347#   3439    3532    3788    3805
UNLD    003316      1866#   3244*   3625*   4114*   4119*   4882*   5042*   6385*   6545*   9314
UNLOAD= 000007      1315#   3630    4124
UNS   = 040000      1372#
UPE   = 020000      1352#
VV    = 000100      1383#
WCE   = 040000      1353#
WDCNT   001442      1833#   5292*   5300*   5301    5433*   5439*   5440    5533*   5543*   5544    5860*   5870*   5871
                   11343
WLE   = 004000      1369#
WORD    001452      1839#
WRDATA= 000023      1321#
WRHEAD= 000027      1323#   5186    5329    5469    5796    6654    6802
WRL   = 004000      1386#
WRTCHK= 000031      1324#
WRTGAT= 040000      1404#
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$CDW1   001270          1762#
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$CHRPC  051622          9630#  9640#  9647   9656#  9661#
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$CM3  =  000000         1703#
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$CNTLC  053754          9904   9985  10113#
$CNTLG  053766          9970  10115#
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$CPUOP  001236          1734#
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                       10093  10113  10174  11535  11540  11550  11563  11576
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                    6692*  6694*  6722*  6725*  6792*  6886*  6898*  7017*  7040*  7107*  7183*  7237*  7261*
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$ETEND  001314      1531   1772#
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$FILLS  001155      1700#  9664
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$GET42  043574      8416#
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$PASS3  003578          3141    9448#   9457
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$RDOCT  003476          10061#  10402
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$RDSZ = 000022          10054#
$RESRE  004624          10349#  10405
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$SAVRE  004566          10333#  10404
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                        9546    9572    9580    9908    9913    9914    9944    10120
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$SUPRS  004526          3742    6360    10303#
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                        3817    3869    3914    4180    4318    4547    4744    4827    4874    5082    5163    5319    5450
                        5574    5777    5893    6091    6278    6377    6618    6999    7224    7562    7903    8274    8390
                        8403    8418    8424    8426    9473    9474    9475    9476    9477    9483    9495    9497    9498
                        9501    9502    9503    9510    9511    9512    9524    9527    9530    9537    9539    9539    9540
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$TKB    001146          1696#   9868    9889    9900    9925    9953    9980
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.$TYPO 1135# 9788

. ABS. 070067 000

ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

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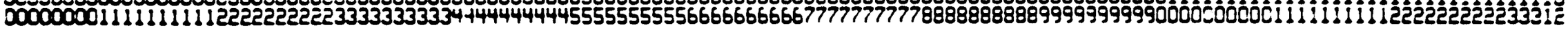
RUN-TIME: 107 104 12 SECONDS
RUN-TIME RATIO: 458/224=2.0
CORE USED: 33K (65 PAGES)

DOCUMENT PAGES: 252

Spooler runtime 39 Seconds, 161 KCS, 1007 disk reads, 0 disk writes, 252 pages

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